

An Open Review on Light Speed Expanding Hubble-Hawking Universe

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Abstract

We make an attempt to review our light speed expanding Hubble-Hawking model of cosmology with reference to cosmic age, temperature, curvature, angular velocity, various cosmological distances associated with galactic red shifts, galactic flat rotation speeds, galactic dark matter and galactic working radii.

Keywords: Planck scale; Big bang; Light speed expansion; Hubble-Hawking model

Introduction

Subject of standard model of cosmology is currently falling in serious disparagements due to dark matter and dark energy issues. It is very surprising to note that, after 20 years of a strong footing, very shocking news is that, based on quintessence driven universe, within coming 100 million years, universe is coming to a halt and slowly getting contraction to form a big crunch [1]. This technical paper has been reviewed by one of the co-founders of the accelerating universe, Saul Perlmutter and got published in Proceedings of the National Academy of Sciences of USA in April 2022. In August 2019, based on the opacity of the universe, a technical paper got published in Monthly Notices of Royal Society on the dimming nature of distance supernovae, cosmic acceleration and dark energy [2]. On the whole, dark energy and quintessence both seem to play a crucial role in understanding the exact nature of cosmic expansion rate. Proceeding further, by considering 740 supernovae data, it has been argued that, observed acceleration is a local effect and no way connected with dark energy [3]. This technical paper has been published in Astronomy & Astrophysics in 2019 November. In this very critical situation, in 2019, it has been suggested that, universe undergoes a series of cyclic process with different phases [4]. This technical paper has been published in Physics Letters B in August 2019. In this context, we emphasize the point that, scientists are not showing interest in understanding the reasons for photon's light speed. We assure the reader that, it will certainly help in understanding cosmic acceleration, dark energy, quintessence and cosmic evolution.

After 90 years of strong observational support, considering the increasing number of dark matter deficient galaxies, another technical paper got published in Nature Astronomy in November 2019 [5]. Most recent and most advanced experiments are

showing their inability in detecting dark matter particles in lower mass range and experimentalists are trying to tune the experimental set up for detecting dark matter particles in various mass ranges [6].

Major Cosmological and Astrophysical Coincidences

Cosmic age and cosmic radius: Currently believed cosmic age is 13.8 billion years. Distance travelled by a photon in 13.8 billion years is 1.3×10^{26} m and is almost all equal to the currently believed Hubble radius $R_0 \equiv (c/H_0)$. It clearly indicates something new about the cosmic expansion speed in terms of speed of photon. We interpret this relation as, from the beginning of Planck scale, universe expands with speed of light. In a mathematical form,

$$R_t - R_{pl} \cong ct \quad (1)$$

Where (R_{pl}, R_t) represent Planck scale cosmic radius and radius at any time t . This can be considered as Assumption-1. Lambda model of cosmic age up to $(1+z)=1100$ can be fitted accurately with,

$$t \cong \left(\frac{1}{1+z} \right)^{\frac{3}{2}} \frac{1}{H_0} \cong \frac{\sqrt{1+z}}{H_t} \quad (2)$$

Where $H_t \equiv (1+z)^2 H_0$ is related with Hubble-Hawking model. It needs a review at fundamental level.

Cosmic critical density, volume and mass: Currently believed cosmic critical density is, $\rho_0 \equiv (3H_0^2/8\pi G)$. Considering the product of currently believed cosmic critical density and Hubble volume, $V_0 \equiv \left(\frac{4\pi}{3} \right) (c/H_0)^3$, it is possible to show that, $M_0 \equiv (c^3/2GH_0)$. On re-arranging this mass expression, $2GM_0/c^2 \equiv c/H_0 \equiv R_0$. It clearly indicates something new about the current universe in terms of current cosmic black hole mass, radius and expansion speed. We interpret this relation as, from the beginning of Planck scale,

$$R_t \cong \frac{c}{H_t} \cong \frac{2GM_t}{c^2} \quad (3)$$

This can be considered as Assumption-2.

Cosmic temperature: Currently believed cosmic temperature T_0 seems to be equal to the geometric mean of Hawking temperature

of Planck mass, $T_{M_{pl}} \equiv \frac{\hbar c^3}{8\pi k_B G M_{pl}}$ and Hawking temperature of current cosmic Hubble mass, $T_{M_0} \equiv \frac{\hbar c^3}{8\pi k_B G M_0}$. In a simplified

form, it can be expressed as, $T_0 \equiv \frac{\hbar c^3}{8\pi k_B G \sqrt{M_{pl} M_0}}$. It clearly indicates something new about the current cosmic temperature in

terms of Hawking's Black hole physics. We interpret this relation as, from the beginning of Planck scale,

$$T_t \equiv \frac{\hbar c^3}{8\pi k_B G \sqrt{M_{pl} M_t}} \equiv \frac{\hbar \sqrt{H_t H_{pl}}}{4\pi k_B} \quad (4A)$$

$$\text{Where } M_t \equiv \frac{c^3}{2GH_t}, \quad M_{pl} \equiv \sqrt{\frac{\hbar c}{G}} \quad \text{and} \quad H_{pl} \equiv \frac{1}{2} \sqrt{\frac{c^5}{\hbar G}}.$$

This can be considered as Assumption-3.

For an observed value of $T_0 \cong 2.72548$ K, estimated $H_0 \cong 2.167867 \times 10^{-18} \text{ sec}^{-1} \cong 66.89 \text{ km/sec/Mpc}$. We would like to emphasize the point that, based on Hawking's black hole temperature formula, geometric mean of Planck mass and the so called Hubble mass, seems to play a crucial role in estimating the observed cosmic microwave back ground temperature, (CMBR) [7]. This kind of relation is missing in Lambda cosmology and to a great extent, currently observed discrepancy or tension in estimating the Hubble parameter can be eliminated.

Considering Planck mass and the Universe, both, as 'point particles', this relation can be derived with three hypothetical conditions,

$$\frac{GM_t M_{pl}}{r_t^2} \cong \left(\frac{c^4}{8\pi G} \right) \quad (5)$$

$$r_t \cong \left(\frac{2.898 \times 10^{-3}}{2\pi T_t} \right) \quad (6)$$

$$M_t \cong \left(\frac{c^3}{2GH_t} \right) \quad (7)$$

Derived relation is,

$$T_t \cong \frac{\hbar c^3}{24.891 k_B G \sqrt{M_{pl} M_t}} \quad (4B)$$

Here, it may be noted that, the denominator coefficient 24.891 is almost equal to $8\pi \cong 25.13274$ and error is 0.962%. With further study and research, relations (4A) and (4B) can be validated and confirmed based on their independent derivative methods.

Light speed growing plank ball having big bang like evolution: Modern cosmologists strongly believe that there exists only big bang and that is responsible for the whole cosmic evolution. We would like to emphasize that - in reality, if big bang is the seed of cosmic evolution, if big bang is a representation of space expansion rather than an explosion, if there exists only one big bang and if one wishes to implement Planck scale in current and past universe, then, Planck mass can be considered as a possible seed of cosmic evolution having light speed expansion.

Cosmological Disagreements and Quantum Cosmology

Technical publications that are having very high impact on science community are raising many new ideas and doubts on dark energy and dark matter. Now it is very clear hat, there is a disagreement in between main stream cosmologists and other researchers. Cosmological observations are not straight forward. For the same data, different interpretations are coming into picture with a great diversity. Right now it is not at all possible to prove the exact nature of cosmic expansion whether it is accelerating or decelerating. In this very ambiguous situation, it seems interesting to take the help of 'light speed' as a tool. There is a possibility for considering light speed radial expansion as well as light speed rotation. We would like to emphasize that,

- So far no single experiment or no single observation confirmed super luminal physical results.
- All cosmological observations and physical studies & research are being accomplished with 'light speed' only.
- It is well confirmed that, gravitons are moving with speed of light.
- In one sentence, 'without light', there is no cosmology and there is no physics.

In this scenario, after publishing our paper in Progress in Physics, we have been inspired by Eugene Terry Tatum's cosmic 'light speed expansion' concept and 'Flat Space Cosmology' [8,9]. It may be noted that, Melia and his team is sincerely working on

$R_h = ct$ models of cosmology [10-13]. Independently, Terry Tatum is seriously working on 'Light speed expanding Flat Space Cosmology' [14]. Rainer Burghardt is working on Subluminal expansion model and he argues that, Melia's model represents a closed model against 'flat model' [15]. Our approach is based on Black hole radius and temperature formulae and is free from dark energy and dark matter concepts [16]. Based on quantum mechanics and black holes, our model helps in understanding cosmic rotation. It may be noted that, assumptions 2 and 3 are applicable only for a closed universe having a positive curvature. We sincerely appeal the readers who are not interested in cosmic rotation may skip the following sections and see section on 'cosmic rotation'. for a logical reasoning.

We propose that, observations attributed to dark matter can be understood as a representation of power law 'super gravity' associated with increasing galactic baryonic mass greater than 4×10^{38} kg. With further study,

- Inflation, acceleration, dark energy and quintessence issues can be relinquished with light speed expansion
- Dark matter issue can be relinquished with super gravity of large baryonic mass content.
- Red shift can be understood with the ratio of change in wavelength to observed wavelength.

Current model of standard cosmology is completely based on General theory of relativity and observations associated with galactic red shifts, distances, flat rotation speeds, gravitational lensing effects and cosmic back ground radiation temperature [17]. Final unification point of view, it seems essential to work on developing a model of Quantum Cosmology (QC) that combines General Theory of Relativity (GTR) and Quantum Mechanics (QM). In this context, by considering 'light speed expansion' and 'Planck scale' as the unified features of GTR and QM, in our recent publications, we have developed a very simple model of QC associated with growing cosmic black hole [18-21]. To proceed further, in the upcoming sections we have highlighted the basic issues of Lambda Cosmology (LC) and suggested the best possible alternative physical concepts.

If it is really important to understand the radical nature of cosmic acceleration, based on light speed expansion, it can be understood as follows. As time is passing, to sustain continuous light speed expansion, galaxies maintain higher acceleration near to cosmic center and lower acceleration near to cosmic boundary. Clearly speaking, being higher in magnitude near to cosmic center, galactic acceleration, gradually disappears at cosmic boundary. In a mathematical form, for the current case, it can be expressed as,

$$(a_r)_0 = [c - (v_r)_0] H_0 \quad (8)$$

where r , (v_r) and (a_r) represent galactic distance, receding speed and acceleration from the cosmic center respectively.

Inadequacy of Lambda Cosmology

Most intriguing concept of LC is 'cosmic evolution'. Clearly speaking, universe is having a beginning and its size and time are increasing. Earlier matter was in the form of radiation and observed matter is being created in the form of growing stars and galaxies with increasing number of elementary atoms and their next level atoms. Another interesting feature is that, universe is expanding with increasing speed (accelerating). These observations were developed on the concept of galactic red shift associated with the observed and laboratory wavelengths of photon, being defined as,

$$z \cong \frac{\lambda_{Observed} - \lambda_{Lab}}{\lambda_{Lab}} \cong \frac{\lambda_{Observed}}{\lambda_{Lab}} - 1 \quad (9)$$

Most complicated feature of LC is current cosmic acceleration [22]. By studying the galactic red shifts and galactic distances, cosmologists are trying to establish the notion of 'accelerating universe'. But in reality, it is practically impossible to investigate and measure the real expansion speeds of galaxies. Another bitter truth is that, as the observed universe is very large, it is absolutely

beyond the scope of human beings to measure the expansion speed of cosmic boundary. Even though, cosmologists are strongly believing in cosmic acceleration and seriously working on chasing its mystery with ‘dark energy’ and ‘Lambda term’ like strange physical entities.

Most controversial feature of LC is galactic dark matter. To understand the observed excess rotation speeds of galactic orbiting stars and to understand the observed galactic gravitational lensing effects, scientists are seriously believing in the existence of ‘dark matter’ as an exotic form of matter not found in the standard particle model. Unfortunately, dark energy and dark matter, both seem to be ‘unphysical’ in nature and raising doubts on the ‘scope’, ‘applicability’ and ‘correctness’ of the basic assumptions of LC and GTR. Unless dark matter and dark energy are identified, LC cannot be considered as a complete model of cosmology [23-29].

Most misleading part of Lambda cosmology

It may be noted that, by the time of defining the definition of galactic red shift, maximum red shift value was around 0.003. We would like to emphasize the point that, definition of galactic red shift is ambiguous [30, 31]. It can also be defined as,

$$z_{new} \cong \frac{\lambda_{Observed} - \lambda_{Lab}}{\lambda_{Observed}} \cong 1 - \frac{\lambda_{Lab}}{\lambda_{Observed}} \cong \frac{z}{z+1} \quad (10)$$

See our recent published papers [18-21]. With reference to current definition, z value lies between 0 and infinity. By following our new definition, z value lies between 0 and 1. It may be noted that, with our given definition, it is very easy to implement ‘light speed expansion’ in cosmic evolution scheme. By considering light speed expansion concept, dark energy and lambda term concepts can be relinquished. Thought of in this way, as there is no evidence for dark energy, the current definition of galactic red shift can be considered as the most misleading part of LC. **FIG. 1** compares galactic light travel distances according to our new definition, $(z_{new})(c/H_0)$ (Red curve) and the conventional formula connected with dark energy density and other density fractions (Green curve).

Based on this new definition of cosmic red shift, observed farthest galaxies distance can be estimated very easily. For example, see the following Table 1. We sincerely appeal that, on cosmological scales, 2.5% is not yet all a ‘serious’ error. We would like to emphasize the point that, conceptually, we are no way deviating from the basic idea of expanding universe and receding galaxies. Only thing is that, we are confining to ‘light speed expansion’ and ‘light speed receding’. With further study, there is a scope for understanding the universe in a unified approach. Since most of the cosmological observations are being studied with photons that move at speed of light, rather than ‘working on controversial cosmic ‘acceleration’ and ‘flatness’ phenomena it is better to work on understanding the root causes of ‘speed of light’.

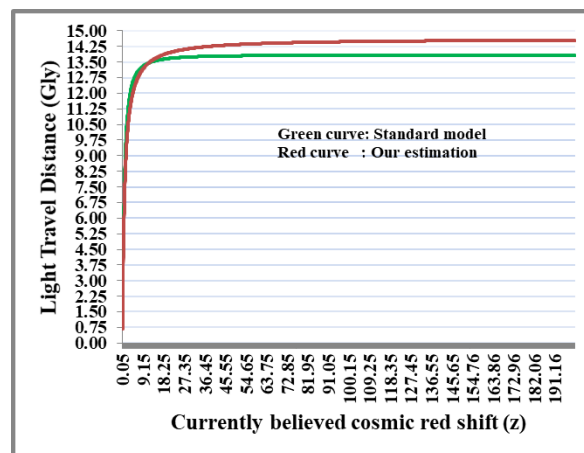


FIG. 1 Comparison of standard and estimated light travel distances.

Richard Powell has written an online C program (<http://www.atlasoftheuniverse.com/cosmodis.e>) (version 1.1) for estimating the light travel distance [32]. Using that program and considering a redshift of $z = (0.1 \text{ to } 200)$, we have prepared **FIG. 1**. Green curve indicates the light travel distance in Lambda cosmology prepared with Omega matter=0.32, Omega lambda=0.68, Omega radiation=0.0 and $H_0 = 66.87 \text{ km/sec/Mpc}$. Red curve indicates our estimated light travel distance,

$$\left(\frac{z}{z+1}\right)\left(\frac{c}{H_0}\right) \cong (z_{new})\left(\frac{c}{H_0}\right) \quad (11)$$

where $H_0 = 66.87 \text{ km/sec/Mpc}$. As traditional redshift is increasing from 0, error in estimated light travel distance is increasing to +8.59% at $z \cong 1.20$ and from there onwards, error is reaching to 0% at $z \cong 11.5$ to 11.55. Proceeding further, error is reaching to -5.14% at $z \cong 200.0$. Here, ‘positive error’ means, and traditional light travel distance is higher than our estimate and ‘negative error’ means, traditional light travel distance is lower than our estimate.

TABLE 1. To estimate and fit the distances of farthest galaxies.

Galaxy	Redshift	Standard Light travel distance (Gly)	Estimated Light travel distance (Gly)	% Error
GN-z11	11.09	13.39	13.41	-0.15
MACS1149-JD1	9.11	13.26	13.17	0.65
EGSY8p7	8.68	13.23	13.11	0.91
A2744 YD4	8.38	13.2	13.06	1.05
EGS-zs8-1	7.73	13.13	12.95	1.41
z7 GSD 3811	7.66	13.11	12.93	1.36
z8_GND_5296	7.51	13.1	12.9	1.51
SXDF-NB1006-2	7.215	13.17	12.84	2.5
GN-108036	7.213	13.07	12.84	2.5
BDF-3299	7.109	13.05	12.84	2.5
A1703 zD6	7.014	13.04	12.84	2.5
BDF-521	7.008	13.04	12.84	2.5
G2-1408	6.972	13.03	12.84	2.5
IOK-1	6.964	13.03	12.84	2.5

This can be also be confirmed with other online cosmic redshift-distance calculators written by Aaron Robotham and Joseph Dunne (<https://cosmocalc.icrar.org/>).

Cosmic scale factor seems to be associated with time and temperature rather than red shift. Scale factor can be expressed as,

$$1+z \cong \sqrt{\exp(\gamma_0 - \gamma_t)} \cong \frac{T_t}{T_0} \quad (12)$$

Where $\gamma_0 \cong 1 + \ln\left(\frac{H_{pl}}{H_0}\right)$ and $\gamma_t \cong 1 + \ln\left(\frac{H_{pl}}{H_t}\right)$

$T_t, T_0 \cong$ Past and current cosmic temperatures.

Currently believed cosmic time scale up to $1+z=1100$ can be expressed as,

$$tH_t \cong \sqrt{1+z} \quad (13)$$

We are working in this direction. If so,

$$t \cong \left(\frac{1}{1+z} \right)^{\frac{3}{2}} \left(\frac{1}{H_0} \right) \cong \frac{\sqrt{1+z}}{H_t} \cong \frac{[\exp(\gamma_0 - \gamma_t)]^{\frac{1}{4}}}{H_t} \quad (14)$$

$$\text{Where } H_t \cong \left(\frac{1}{H_{pl}} \right) \left(\frac{4\pi k_B T_t}{h} \right)^2 \cong 2 \sqrt{\frac{Gh}{c^5}} \left(\frac{4\pi k_B T_t}{h} \right)^2.$$

Interesting observation to be noted is that,

$$\frac{H_t}{H_0} \cong \exp(\gamma_0 - \gamma_t) \cong (1+z)^2 \quad (15)$$

Super Gravity of Baryonic Matter

Considering the case of supposition of dark matter through gravitational interaction, inferring the negative results of dark matter experiments and following the ongoing debate concerning the existence of exotic form of dark matter, we are proposing the existence of a power law based super gravitational behavior of baryonic matter as a possible explanation for the observed galactic rotation curve anomalies. We would like to emphasize the point that, in reality there exists no dark matter and equivalent mass of galactic dark matter can be defined as [33],

$$(M_{dark})_G \cong (M_{baryon})_G^{3/2} / (4 \times 10^{38})^{1/2} \text{ kg} \quad (16)$$

where $4 \times 10^{38} \text{ kg}$ (200 million solar masses) can be considered as the ‘current reference mass unit’.

Based on this idea, galactic masses less than $4 \times 10^{38} \text{ kg}$ will have a decreasing trend of super gravity and galactic masses greater than $4 \times 10^{38} \text{ kg}$ will have an increasing trend of super gravity and it is proportional to $(M_{baryon})_G^{3/2}$. Total mass of galaxy can be expressed as, $M_G \cong (M_{baryon})_G + (M_{dark})_G$. Following this relation, galactic flat rotation speeds can be understood with a relation of the form,

$$\left. \begin{aligned} \frac{V_G}{c} &\cong \frac{1}{4} \left[\frac{[(M_{baryon})_G + (M_{dark})_G]}{M_0} \right]^{1/4} \cong \frac{1}{4} \left[\frac{M_G}{M_0} \right]^{1/4} \\ \Rightarrow V_G &\cong \left[\frac{G[(M_{baryon})_G + (M_{dark})_G]cH_0}{128} \right]^{1/4} \cong \left[\frac{GM_GcH_0}{128} \right]^{1/4} \end{aligned} \right\} \quad (17)$$

Where $M_0 \cong \frac{c^3}{2GH_0} \cong \text{Current Hubble mass}$.

This can be considered as assumption-4. Flat rotation speeds from 10 km/sec to 500 km/sec can be understood in this way. Our proposal is in line with newly discovered dark matter deficient galaxies and large massive galaxies having high flat rotation speeds [34, 35].

Another interesting feature is that, Sun’s estimated equivalent dark mass is around $1.5 \times 10^{26} \text{ kg}$ and its effect seems to be negligible. It needs observational and experimental confirmation. To some extent, considering the estimated Virial mass of Sun and based on the theory of light bending, our proposal can be confirmed. Nucleons estimated equivalent dark mass is around 10^{-60} kg and it needs

experimental verification.

See the following **FIG. 2** and **FIG. 3** where reference mass is $(M_{\text{Ref}})_0 \cong 3.89 \times 10^{38} \text{ kg} = 195.6 \text{ million solar masses}$. **FIG. 2** shows an increase in dark mass with corresponding increase in baryonic mass [31]. **FIG. 3** shows a comparative increase in galactic flat rotation speeds against MOND [26]. It may be noted that, rotation speed of UGC 12591 is $(488.4 \pm 12.5) \text{ km/sec}$ and our estimated baryonic mass is $(2.0 \text{ to } 2.25) \times 10^{42} \text{ kg}$ comparable with recent estimation of $1.37 \times 10^{42} \text{ kg}$ [36].

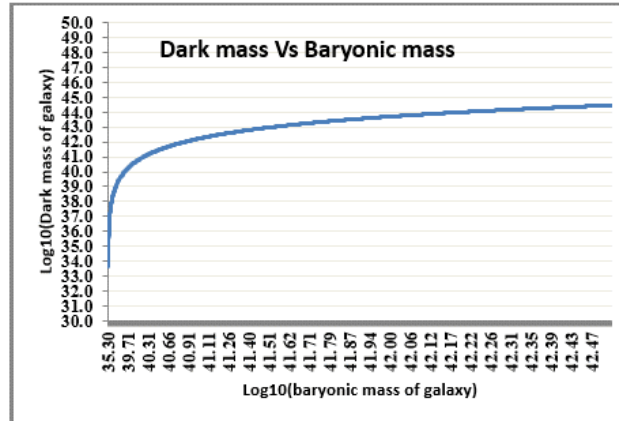


FIG. 2 Galactic baryonic mass Vs Dark mass.

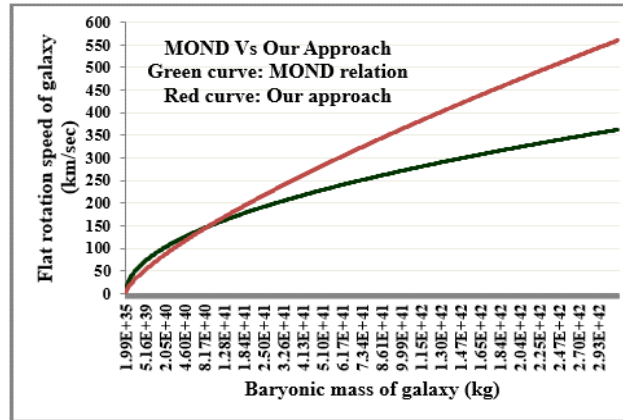


FIG. 3 Galactic flat rotation speeds.

Considering 200 million solar masses as a characteristic representation of current cosmic weak interaction mass unit, there is a scope to implement weak boson masses and Higg's field in understanding the hypothesized mass of galactic dark matter [37]. Clearly speaking, without considering dark matter, weak interaction can be considered as a boosting drive for the observed super gravity of galactic baryonic mass. Based on this idea, we have developed the following relation for estimating the proposed 200 million solar masses.

$$\left. \begin{aligned} (M_{\text{Ref}})_0 &\cong \ln \left(\frac{T_{pl}^4}{T_0^4} \right) \times \left(\frac{M_0}{M_{pl}} \right) \times (80.4 + 91.2) \text{ GeV}/c^2 \\ &\cong \ln \left(\frac{H_{pl}^2}{H_0^2} \right) \times \left(\frac{M_0}{M_{pl}} \right) \times (80.4 + 91.2) \text{ GeV}/c^2 \\ &\cong \ln \left(\frac{M_0}{M_{pl}} \right) \times \left(\frac{M_0}{M_{pl}} \right) \times [(2 * 80.4) + (2 * 91.2)] \text{ GeV}/c^2 \\ &\cong 183.5 \text{ Million solar masses} \end{aligned} \right\} \quad (18)$$

Where,
$$\left\{ \begin{aligned} M_{pl} &\cong \sqrt{\frac{\hbar c}{G}} \cong \frac{c^3}{2GH_{pl}} \cong 2.176 \times 10^{-8} \text{ kg}, T_{pl} \cong \frac{\hbar c^3}{8\pi k_B G M_{pl}} \cong \frac{\hbar H_{pl}}{4\pi k_B} \\ M_0 &\cong \frac{c^3}{2GH_0} \cong 9.3 \times 10^{52} \text{ kg}, T_0 \cong \frac{\hbar c^3}{8\pi k_B G \sqrt{M_0 M_{pl}}} \cong \frac{\hbar \sqrt{H_0 H_{pl}}}{4\pi k_B} \end{aligned} \right.$$

This formula needs a physical interpretation and we are working on it. It seems that, continuous decay or annihilation of large number of charged and weak bosons generate so many force carriers in such a way that, any baryonic galaxy experiences a kind of dark matter like super attracting force or super gravity.

Standard Ruler associated with Baryon Acoustic Oscillations

As per the cosmic Baryon Acoustic Oscillations (BAO), current acoustic bubble radius is around 150 Gpc [38, 39]. This characteristic length can be fitted with a simple relation of the form,

$$\sqrt{\frac{T_0}{T_{\text{Recomb}}}} \left(\frac{c}{H_0} \right) \cong \frac{c}{H_{\text{Recomb}}^{1/4} H_0^{3/4}} \cong 135 \text{ Mpc} \quad (19)$$

where T_{Recomb} and H_{Recomb} represent recombination epoch temperature and Hubble parameter respectively. Hawking's black hole temperature formula pertaining to recombination epoch can be expressed as,

$$T_{\text{Recomb}} \cong \frac{\hbar c^3}{8\pi k_B G \sqrt{M_{\text{Recomb}} M_{pl}}} \cong \frac{\hbar \sqrt{H_{\text{Recomb}} H_{pl}}}{4\pi k_B G} \quad (20)$$

Clearly speaking, light speed being a characteristic feature of cosmic expansion and $H_{\text{Recomb}}^{1/4}$ being a characteristic feature of cosmic recombination, baryon acoustic bubble radius seems to be inversely proportional to $H_0^{3/4}$. It needs further study.

Based on the BAO bubble radius, we have noticed another interesting relation for understanding the cosmological origin of 200 Million solar masses. It can be expressed as,

$$\frac{M_0}{(M_{\text{Ref}})_0} \cong \exp \left(\sqrt{\frac{T_{\text{Recomb}}}{T_0}} \right) \quad (21)$$

Considering T_{Recomb} as 3000 K and T_0 as 2.725 K,

$$(M_{\text{Ref}})_0 \cong \frac{M_0}{\exp \left(\sqrt{\frac{T_{\text{Recomb}}}{T_0}} \right)} \cong 3.62 \times 10^{38} \text{ kg} \cong 181.94 \text{ Million solar masses.} \quad (22)$$

Hence,

$$\frac{M_0}{(M_{\text{Ref}})_o} \cong \exp\left(\sqrt{\frac{T_{\text{Recomb}}}{T_0}}\right) \cong \exp\left(\frac{c}{(R_{\text{BAO}})_0 H_0}\right) \quad (23)$$

In this way, it seems possible to understand the mystery of the proposed reference mass unit in terms of Recombination and Baryon acoustic oscillations. We are working in this direction also.

Estimation of Distances Associated with Galactic Flat Rotation Speeds

Following the concepts proposed in previous section we suggest the following points for further study and observation.

- Galactic total mass can be considered as the sum of galactic baryonic mass and dark mass.
- As galactic total mass increases, galactic flat rotation speed as well as the distance associated with flat rotation speed increases.
- Galactic core radius seems to depend on galactic baryon mass, current cosmic Hubble mass and the ratio of galactic baryon mass to total mass.
- Galactic flat rotation distance seems to depend on galactic total mass, current cosmic Hubble mass and the ratio of galactic baryon mass to total mass.

Based on these points, we noticed a very simple relation for galactic flat rotation distances. It can be expressed as,

$$r_f \cong \frac{2G\sqrt{(M_{\text{baryon}})_G M_0}}{c^2} \cong \sqrt{\frac{2G(M_{\text{baryon}})_G}{cH_0}} \cong \sqrt{\left(\frac{2G(M_{\text{baryon}})_G}{c^2}\right)\left(\frac{c}{H_0}\right)} \quad (24)$$

Where

$$\begin{cases} r_f = \text{Distance from galactic center associated with flat rotation speed.} \\ (M_{\text{baryon}})_G = \text{Galactic baryon mass.} \\ M_0 \cong \frac{c^3}{2G_N H_0} = \text{Current cosmic Hubble mass.} \end{cases}$$

Galactic core radius can be expressed as,

$$r_c \cong \sqrt{\frac{M_0}{M_G}} \left(\frac{2G(M_{\text{baryon}})_G}{c^2} \right) \quad (25)$$

Based on relations (24) and (25),

$$\begin{aligned} \frac{r_f}{r_c} &\cong \frac{\text{Distance from galactic center associated with flat rotation speed}}{\text{Galactic core radius}} \\ &\cong \sqrt{\frac{M_G}{(M_{\text{baryon}})_G}} \cong \sqrt{1 + \frac{(M_{\text{dark}})_G}{(M_{\text{baryon}})_G}} \end{aligned} \quad (26)$$

Interesting point to be noted is that, by knowing the galactic flat rotation speed and flat rotation distance, galactic baryon mass, galactic total mass and hence galactic dark mass can be estimated in a unified approach. This is for observational test.

Galactic whole radius can be expressed as,

$$R_G \equiv \left(\frac{16G \sqrt{[(M_{baryon})_G + (M_{dark})_G] M_0}}{c^2} \right) \equiv \left(\frac{16G \sqrt{M_G M_0}}{c^2} \right) \equiv \sqrt{\frac{128 G M_G}{c H_0}} \quad (27)$$

Where $\begin{cases} (M_{dark})_G = \text{Galactic dark mass.} \\ M_G = (M_{baryon})_G + (M_{dark})_G = \text{Galactic total mass} \end{cases}$

It may be noted that, based on relations (24) to (27), galactic masses, flat rotation speeds and corresponding distances can be studied in a unified approach. Estimated baryon and dark masses can be compared with existing methods. Advantage of our approach is that, current cosmic Hubble mass can be considered as a key tool in exploring the structural secrets of galaxies. Galactic rotation curves for $r \geq r_c$ can be approximated with the following relations. It needs a fine tuning based on the actual curve [40].

$$\begin{aligned} V_r &\equiv \frac{1}{3} \left[1 + \ln \left(\frac{r}{r_c} \right) + \frac{1}{2} \ln \left(\frac{M_G}{(M_{baryon})_G} \right) \right] \left[\frac{G M_G V_{Ref}^2}{r} \right]^{\frac{1}{4}} - (28A) \\ V_r &\equiv \frac{1}{3} \left[1 + \ln \left(\frac{r}{r_c} \right) + \frac{1}{3} \ln \left(\frac{M_G}{M_{(baryon)_G}} \right) \right] \left[\frac{G M_G V_{Ref}^2}{r} \right]^{\frac{1}{4}} - (28B) \end{aligned} \quad (28)$$

Where $\begin{cases} V_{Ref} \equiv \left[\frac{G (M_{Ref})_0 c H_0}{128} \right]^{1/4} \cong 19.2 \text{ km/sec} \\ (M_{Ref})_0 \cong 4 \times 10^{38} \text{ kg} = 200 \text{ million solar masses} \end{cases}$

Thus, the proposed reference mass unit of 200 million solar masses seems to play a crucial role in deciding galactic structures. See the following Figure 4 pertaining to estimated Milky Way rotation Curves for 1.4 kpc to 319 kpc [41]. Estimated baryon mass, dark mass and total mass of Milky Way are, $1.2 \times 10^{11} M_\odot$, $2.94 \times 10^{12} M_\odot$ and $3.06 \times 10^{12} M_\odot$ respectively. Blue curve represents relation (28A) and black curve represents relation (28B). Based on relation (26), in terms of galactic core radius and flat rotation distance, galactic rotation curve can be re-expressed as,

$$\begin{aligned} V_r &\equiv \frac{1}{3} \left[1 + \ln \left(\frac{r}{r_c} \right) + \ln \left(\frac{r_f}{r_c} \right) \right] \left[\frac{G M_G V_{Ref}^2}{r} \right]^{\frac{1}{4}} - (29A) \\ V_r &\equiv \frac{1}{3} \left[1 + \ln \left(\frac{r}{r_c} \right) + \frac{2}{3} \ln \left(\frac{r_f}{r_c} \right) \right] \left[\frac{G M_G V_{Ref}^2}{r} \right]^{\frac{1}{4}} - (29B) \end{aligned} \quad (29)$$

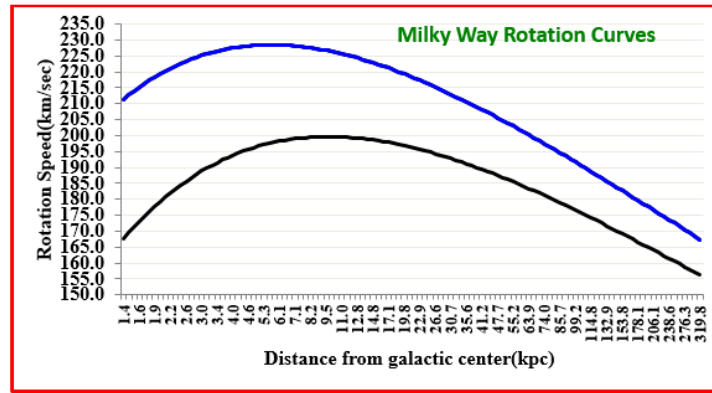


FIG. 4 Estimated Milky Way Rotation Curves.

On Cosmic Rotation and Cosmic Center

Considering the evolving universe as a growing black hole or simply a white hole [18], it seems natural to expect cosmic rotation [42]. We would like to emphasize the point that, Spin is a basic property of QM and one who is interested in developing quantum models of cosmology, must think about cosmic rotation. It may be noted that, without a radial in-flow of matter in all directions towards one specific point, one cannot expect a big crunch and without a big crunch, one cannot expect a big bang. Really if there was a “big bang” in the past, with reference to formation of big bang as predicted by GTR and with reference to the cosmic rate of expansion that might have taken place simultaneously in all directions at a “naturally selected rate” about the point of big bang: “point” of big bang can be considered as the characteristic reference point of cosmic expansion in all directions. Thinking in this way, to some extent, point of big bang can be considered as a possible centre of cosmic evolution. If so, thinking about the universe without a center of rotation is illogical. Based on this logic, we appeal the science community to see the possibility of thinking about angular velocity, cosmic rotation and rotational axis [43-48].

Based on references [1,4], it is going to be happened that, within coming 100 million years, cosmic expansion is reaching a halt and moving towards a big crunch. In this context, we emphasize the point that, without a radial in-flow of matter in all directions towards any one specific point, it may not be possible to have a big crunch and discussing on center less universe having a big bang or big bounce seems to be meaningless.

As per the recent 2020 publication, according to Vladimir A. Korotky, Eduard Masar and Yuri N. Obukhov: “In observational cosmology, the main difficulty for detecting a global rotation is its smallness-less than 10^{-13} rad/year according to the generally accepted assessment [49]. It is impossible in the Universe to distinguish the direction corresponding to the axis of rotation, with respect to which one could notice deviations (in the standard tests) from the Friedman standard cosmology. In theoretical cosmology, the main difficulties are related, on the one hand, to the lack of simple models of an expanding and rotating Universe in general relativity (GR) similar to Friedman–Robertson–Walker models. On the other hand, there are no convincing predictive effects of cosmic rotation that are consistent with the capabilities of the equipment of modern astronomical observatories”.

Based on relations (17), (24) to (27), cosmic angular velocity can be expressed as [33, 46],

$$\omega_0 \cong \left[\frac{H_0}{128} \right] \cong 1.694 \times 10^{-20} \text{ rad/sec} \cong 5.345 \times 10^{-13} \text{ rad/year} \quad (30)$$

Following this relation, galactic flat rotation speeds can be expressed as,

$$V_G \cong \left[\frac{GM_G c H_0}{128} \right]^{1/4} \cong [GM_G c \omega_0]^{1/4} \quad (31)$$

Where c represents cosmic expansion speed and ω_0 represents cosmic angular velocity. It needs further study and observations.

Galactic whole radius can be expressed as [33],

$$R_G \cong \sqrt{\frac{128GM_G}{cH_0}} \cong \sqrt{\frac{GM_G}{c\omega_0}} \quad (32)$$

Various Cosmological Distances

Based on the new red shift definition as discussed in previous section, various distances associated with galactic light can be understood in the following way.

Light Travel Distance can be approximated with,

$$LTD \cong z_{new} \left(\frac{c}{H_0} \right) \quad (33)$$

Comoving Distance can be approximated with,

$$CD \cong \exp(z_{new}) * LTD \quad (34)$$

Luminosity Distance can be approximated with,

$$LD \cong \frac{CD}{1 - z_{new}} \quad (35)$$

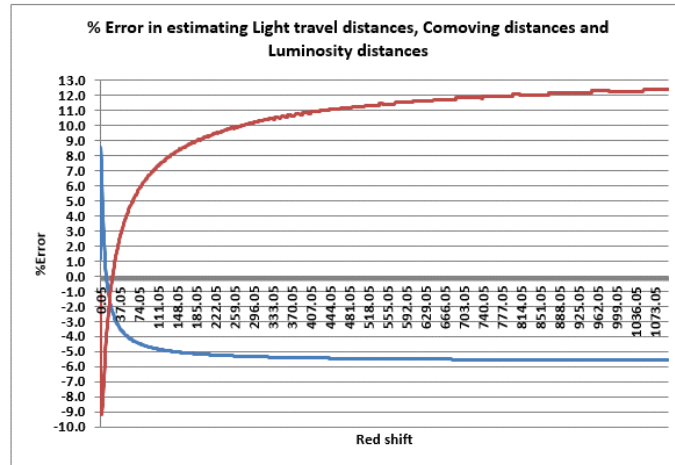


FIG. 5 Comparative study of various cosmological distances.

TABLE 2 Comparative Study of Various Cosmological Distances in Gly.

Red shift (z)	Modified Red shift (z/(1+z))	Light travel distance as per Lambda Cosmology	Light travel distance in Hubble-Hawking Cosmology	% error in Light travel distance (Blue curve in the graph)	Comoving distance as per Lambda Cosmology	Comoving distance in Hubble-Hawking Cosmology	% error in Comoving distance (Red curve in the graph)	Luminosity distance as per Lambda Cosmology	Luminosity distance in Hubble-Hawking Cosmology	% error in Luminosity distance (Red curve in the graph)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
0.05	0.048	0.704	0.696	1.174	0.722	0.73	-1.149	0.76	0.767	-1.149

1.05	0.512	8.188	7.487	8.558	11.545	12.495	-8.233	23.67	25.616	-8.233
2.05	0.672	10.643	9.825	7.685	17.618	19.241	-9.211	53.74	58.685	-9.211
3.05	0.753	11.735	11.008	6.197	21.435	23.376	-9.059	86.81	94.674	-9.059
4.05	0.802	12.324	11.723	4.875	24.085	26.142	-8.537	121.63	132.014	-8.537
5.05	0.835	12.681	12.201	3.784	26.056	28.114	-7.898	157.64	170.088	-7.898
6.05	0.858	12.918	12.544	2.894	27.599	29.589	-7.21	194.57	208.602	-7.21
7.05	0.876	13.083	12.802	2.152	28.842	30.733	-6.556	232.18	247.403	-6.556
8.05	0.89	13.204	13.002	1.528	29.873	31.646	-5.936	270.35	286.4	-5.936
9.05	0.9	13.296	13.163	1	30.748	32.392	-5.344	309.02	325.537	-5.344
10.05	0.91	13.367	13.295	0.545	31.501	33.012	-4.794	348.09	364.778	-4.794
11.05	0.917	13.424	13.404	0.149	32.158	33.535	-4.283	387.5	404.098	-4.283
12.05	0.923	13.471	13.497	-0.196	32.742	33.983	-3.79	427.28	443.479	-3.79
13.05	0.929	13.509	13.577	-0.505	33.254	34.371	-3.357	467.22	482.909	-3.357
14.05	0.934	13.541	13.646	-0.775	33.726	34.71	-2.916	507.58	522.378	-2.916
15.05	0.938	13.568	13.707	-1.022	34.143	35.008	-2.535	547.99	561.879	-2.535
16.05	0.941	13.591	13.76	-1.245	34.52	35.273	-2.182	588.57	601.407	-2.182
17.05	0.945	13.611	13.808	-1.443	34.876	35.51	-1.818	629.51	640.957	-1.818
18.05	0.948	13.629	13.85	-1.626	35.198	35.723	-1.493	670.52	680.526	-1.493
19.05	0.95	13.644	13.888	-1.794	35.494	35.916	-1.189	711.65	720.111	-1.189
20.05	0.952	13.657	13.923	-1.946	35.774	36.091	-0.886	753.04	759.711	-0.886
21.05	0.955	13.669	13.955	-2.089	36.025	36.25	-0.626	794.35	799.321	-0.626
22.05	0.957	13.68	13.983	-2.218	36.269	36.397	-0.351	836.01	838.943	-0.351
23.05	0.958	13.689	14.01	-2.34	36.494	36.531	-0.101	877.69	878.574	-0.101
24.05	0.96	13.698	14.034	-2.451	36.711	36.655	0.152	919.61	918.213	0.152
25.05	0.962	13.706	14.056	-2.557	36.906	36.77	0.369	961.41	957.859	0.369
26.05	0.963	13.713	14.077	-2.656	37.092	36.877	0.58	1003.33	997.511	0.58
27.05	0.964	13.719	14.096	-2.749	37.267	36.976	0.782	1045.35	1037.17	0.782
28.05	0.966	13.726	14.114	-2.832	37.446	37.068	1.009	1087.81	1076.83	1.009
29.05	0.967	13.731	14.131	-2.915	37.6	37.155	1.184	1129.87	1116.5	1.184
30.05	0.968	13.736	14.147	-2.991	37.756	37.236	1.378	1172.33	1156.17	1.378
31.05	0.969	13.74	14.161	-3.064	37.901	37.312	1.553	1214.71	1195.85	1.553
32.05	0.97	13.744	14.175	-3.134	38.033	37.384	1.706	1256.98	1235.53	1.706
33.05	0.971	13.748	14.188	-3.198	38.167	37.451	1.874	1299.57	1275.21	1.874
34.05	0.971	13.752	14.2	-3.258	38.303	37.515	2.056	1342.5	1314.9	2.056
35.05	0.972	13.756	14.212	-3.316	38.425	37.575	2.212	1385.23	1354.59	2.212
36.05	0.973	13.759	14.223	-3.373	38.534	37.632	2.34	1427.69	1394.28	2.34
37.05	0.974	13.762	14.233	-3.426	38.644	37.686	2.479	1470.41	1433.97	2.479
38.05	0.974	13.765	14.243	-3.476	38.756	37.738	2.627	1513.42	1473.66	2.627
39.05	0.975	13.767	14.252	-3.525	38.853	37.787	2.744	1556.05	1513.36	2.744
40.05	0.976	13.77	14.261	-3.572	38.951	37.833	2.869	1598.93	1553.06	2.869
41.05	0.976	13.772	14.27	-3.615	39.05	37.878	3.002	1642.06	1592.76	3.002
42.05	0.977	13.774	14.278	-3.656	39.151	37.92	3.143	1685.44	1632.46	3.143
43.05	0.977	13.776	14.286	-3.698	39.235	37.961	3.249	1728.32	1672.16	3.249

44.05	0.978	13.778	14.293	-3.737	39.321	37.999	3.361	1771.41	1711.87	3.361
45.05	0.978	13.78	14.3	-3.773	39.408	38.036	3.48	1814.72	1751.58	3.48
46.05	0.979	13.782	14.307	-3.811	39.478	38.072	3.561	1857.43	1791.28	3.561
47.05	0.979	13.783	14.313	-3.844	39.566	38.106	3.69	1901.15	1830.99	3.691
48.05	0.98	13.785	14.319	-3.878	39.638	38.139	3.782	1944.23	1870.7	3.782
49.05	0.98	13.786	14.325	-3.91	39.71	38.17	3.878	1987.48	1910.41	3.878
50.05	0.98	13.788	14.331	-3.941	39.783	38.2	3.978	2030.91	1950.12	3.978
51.05	0.981	13.789	14.337	-3.97	39.856	38.229	4.082	2074.53	1989.83	4.083
52.05	0.981	13.79	14.342	-4	39.912	38.257	4.146	2117.34	2029.55	4.146
53.05	0.981	13.792	14.347	-4.026	39.987	38.284	4.259	2161.31	2069.26	4.259
54.05	0.982	13.793	14.352	-4.054	40.044	38.31	4.33	2204.42	2108.98	4.329
55.05	0.982	13.794	14.357	-4.078	40.12	38.335	4.449	2248.75	2148.69	4.449
56.05	0.982	13.795	14.361	-4.104	40.178	38.36	4.527	2292.17	2188.41	4.527
57.05	0.983	13.796	14.366	-4.128	40.237	38.383	4.607	2335.73	2228.13	4.607
58.05	0.983	13.797	14.37	-4.151	40.296	38.405	4.69	2379.45	2267.84	4.69
59.05	0.983	13.798	14.374	-4.176	40.335	38.427	4.73	2422.12	2307.56	4.729
60.05	0.984	13.799	14.378	-4.198	40.395	38.448	4.818	2466.1	2347.28	4.818
61.05	0.984	13.8	14.382	-4.218	40.455	38.469	4.909	2510.23	2387	4.909
62.05	0.984	13.8	14.386	-4.24	40.496	38.489	4.955	2553.24	2426.71	4.955
63.05	0.984	13.801	14.389	-4.259	40.557	38.508	5.051	2597.66	2466.44	5.051
64.05	0.985	13.802	14.393	-4.28	40.598	38.527	5.102	2640.89	2506.15	5.102
65.05	0.985	13.803	14.396	-4.297	40.66	38.545	5.202	2685.59	2545.87	5.202
66.05	0.985	13.804	14.399	-4.317	40.702	38.562	5.257	2729.05	2585.6	5.256
67.05	0.985	13.804	14.403	-4.335	40.744	38.579	5.313	2772.62	2625.32	5.312
68.05	0.986	13.805	14.406	-4.353	40.786	38.596	5.37	2816.29	2665.04	5.37
69.05	0.986	13.805	14.409	-4.37	40.829	38.612	5.43	2860.06	2704.77	5.43
70.05	0.986	13.806	14.412	-4.387	40.872	38.628	5.491	2903.94	2744.48	5.491
71.05	0.986	13.807	14.415	-4.403	40.915	38.643	5.554	2947.92	2784.21	5.554
72.05	0.986	13.807	14.417	-4.419	40.959	38.658	5.618	2992.02	2823.93	5.618
73.05	0.986	13.808	14.42	-4.434	41.002	38.672	5.684	3036.22	2863.65	5.684
74.05	0.987	13.808	14.423	-4.448	41.047	38.686	5.751	3080.54	2903.38	5.751
75.05	0.987	13.809	14.425	-4.462	41.091	38.7	5.82	3124.97	2943.1	5.82
76.05	0.987	13.809	14.428	-4.478	41.113	38.713	5.839	3167.79	2982.82	5.839
77.05	0.987	13.81	14.43	-4.491	41.158	38.726	5.91	3212.41	3022.55	5.91
78.05	0.987	13.81	14.433	-4.506	41.181	38.739	5.931	3255.36	3062.28	5.931
79.05	0.988	13.811	14.435	-4.519	41.227	38.751	6.005	3300.18	3102	6.005
80.05	0.988	13.811	14.437	-4.531	41.272	38.763	6.081	3345.13	3141.73	6.08
81.05	0.988	13.812	14.439	-4.544	41.296	38.775	6.105	3388.29	3181.44	6.105
82.05	0.988	13.812	14.441	-4.556	41.342	38.786	6.182	3433.44	3221.18	6.182
83.05	0.988	13.812	14.444	-4.569	41.365	38.797	6.208	3476.75	3260.9	6.208
84.05	0.988	13.813	14.446	-4.582	41.389	38.808	6.235	3520.11	3300.63	6.235
85.05	0.988	13.813	14.448	-4.592	41.436	38.819	6.316	3565.56	3340.35	6.316
86.05	0.989	13.814	14.45	-4.604	41.46	38.829	6.345	3609.06	3380.08	6.345

87.05	0.989	13.814	14.451	-4.616	41.484	38.839	6.374	3652.62	3419.81	6.374
88.05	0.989	13.814	14.453	-4.625	41.532	38.849	6.458	3698.38	3459.54	6.458
89.05	0.989	13.815	14.455	-4.636	41.556	38.859	6.489	3742.08	3499.26	6.489
90.05	0.989	13.815	14.457	-4.647	41.58	38.869	6.521	3785.85	3538.98	6.521
91.05	0.989	13.815	14.459	-4.658	41.604	38.878	6.553	3829.67	3578.71	6.553
92.05	0.989	13.816	14.46	-4.666	41.653	38.887	6.641	3875.84	3618.45	6.641
93.05	0.989	13.816	14.462	-4.676	41.678	38.896	6.675	3919.82	3658.17	6.675
94.05	0.989	13.816	14.464	-4.686	41.703	38.905	6.71	3963.85	3697.91	6.709
95.05	0.99	13.817	14.465	-4.696	41.728	38.913	6.745	4007.95	3737.62	6.745
96.05	0.99	13.817	14.467	-4.705	41.753	38.922	6.781	4052.11	3777.35	6.781
97.05	0.99	13.817	14.468	-4.714	41.778	38.93	6.817	4096.33	3817.08	6.817
98.05	0.99	13.817	14.47	-4.723	41.803	38.938	6.854	4140.61	3856.82	6.854
99.05	0.99	13.818	14.471	-4.732	41.829	38.946	6.892	4184.96	3896.55	6.892
100.05	0.99	13.818	14.473	-4.74	41.854	38.954	6.93	4229.37	3936.26	6.93
101.05	0.99	13.818	14.474	-4.749	41.88	38.961	6.969	4273.84	3975.99	6.969
102.05	0.99	13.818	14.476	-4.757	41.906	38.969	7.008	4318.38	4015.71	7.009
103.05	0.99	13.819	14.477	-4.765	41.932	38.976	7.049	4362.98	4055.45	7.049
104.05	0.99	13.819	14.478	-4.773	41.958	38.983	7.089	4407.65	4095.18	7.089
105.05	0.991	13.819	14.48	-4.78	41.984	38.99	7.13	4452.38	4134.91	7.13
106.05	0.991	13.819	14.481	-4.788	42.01	38.997	7.172	4497.18	4174.64	7.172
107.05	0.991	13.819	14.482	-4.797	42.01	39.004	7.156	4539.19	4214.36	7.156
108.05	0.991	13.82	14.483	-4.804	42.037	39.011	7.199	4584.08	4254.09	7.199
109.05	0.991	13.82	14.485	-4.811	42.063	39.017	7.242	4629.05	4293.82	7.242
110.05	0.991	13.82	14.486	-4.818	42.09	39.024	7.285	4674.08	4333.56	7.285
111.05	0.991	13.82	14.487	-4.824	42.117	39.03	7.33	4719.18	4373.28	7.33
112.05	0.991	13.821	14.488	-4.831	42.144	39.036	7.374	4764.35	4413.02	7.374
113.05	0.991	13.821	14.489	-4.839	42.144	39.042	7.36	4806.5	4452.75	7.36
114.05	0.991	13.821	14.49	-4.845	42.171	39.048	7.405	4851.77	4492.49	7.405
115.05	0.991	13.821	14.492	-4.851	42.198	39.054	7.451	4897.11	4532.2	7.451
116.05	0.991	13.821	14.493	-4.857	42.226	39.06	7.498	4942.52	4571.93	7.498
117.05	0.992	13.821	14.494	-4.865	42.226	39.065	7.485	4984.75	4611.65	7.485
118.05	0.992	13.821	14.495	-4.871	42.253	39.071	7.532	5030.26	4651.39	7.532
119.05	0.992	13.822	14.496	-4.877	42.281	39.076	7.58	5075.85	4691.12	7.58
120.05	0.992	13.822	14.497	-4.884	42.281	39.082	7.567	5118.14	4730.87	7.567
121.05	0.992	13.822	14.498	-4.889	42.309	39.087	7.615	5163.83	4770.58	7.615
122.05	0.992	13.822	14.499	-4.895	42.337	39.092	7.664	5209.6	4810.31	7.665
123.05	0.992	13.822	14.5	-4.901	42.337	39.098	7.652	5251.94	4850.03	7.653
124.05	0.992	13.822	14.501	-4.907	42.366	39.103	7.702	5297.81	4889.78	7.702
125.05	0.992	13.823	14.502	-4.912	42.394	39.108	7.752	5343.76	4929.5	7.752
126.05	0.992	13.823	14.502	-4.918	42.394	39.113	7.741	5386.16	4969.24	7.741
127.05	0.992	13.823	14.503	-4.923	42.423	39.117	7.791	5432.22	5008.96	7.792
128.05	0.992	13.823	14.504	-4.928	42.451	39.122	7.843	5478.36	5048.68	7.843
129.05	0.992	13.823	14.505	-4.934	42.451	39.127	7.832	5520.81	5088.43	7.832

130.05	0.992	13.823	14.506	-4.938	42.48	39.131	7.884	5567.06	5128.18	7.884
131.05	0.992	13.823	14.507	-4.945	42.48	39.136	7.873	5609.54	5167.89	7.873
132.05	0.992	13.823	14.508	-4.949	42.51	39.14	7.926	5655.9	5207.62	7.926
133.05	0.993	13.823	14.508	-4.955	42.51	39.145	7.916	5698.41	5247.37	7.915
134.05	0.993	13.824	14.509	-4.959	42.539	39.149	7.969	5744.89	5287.07	7.969
135.05	0.993	13.824	14.51	-4.965	42.539	39.153	7.959	5787.43	5326.8	7.959
136.05	0.993	13.824	14.511	-4.969	42.569	39.158	8.013	5834.02	5366.54	8.013
137.05	0.993	13.824	14.512	-4.973	42.598	39.162	8.067	5880.69	5406.28	8.067
138.05	0.993	13.824	14.512	-4.978	42.598	39.166	8.058	5923.29	5446.01	8.058
139.05	0.993	13.824	14.513	-4.982	42.628	39.17	8.113	5970.08	5485.76	8.112
140.05	0.993	13.824	14.514	-4.987	42.628	39.174	8.104	6012.71	5525.48	8.103
141.05	0.993	13.825	14.515	-4.991	42.658	39.178	8.159	6059.62	5565.19	8.159
142.05	0.993	13.825	14.515	-4.996	42.658	39.182	8.15	6102.28	5604.94	8.15
143.05	0.993	13.825	14.516	-5	42.689	39.186	8.207	6149.31	5644.67	8.207
144.05	0.993	13.825	14.517	-5.005	42.689	39.189	8.198	6192	5684.4	8.198
145.05	0.993	13.825	14.517	-5.008	42.719	39.193	8.255	6239.16	5724.13	8.255
146.05	0.993	13.825	14.518	-5.013	42.719	39.197	8.246	6281.88	5763.86	8.246
147.05	0.993	13.825	14.519	-5.018	42.719	39.2	8.238	6324.6	5803.61	8.238
148.05	0.993	13.825	14.519	-5.021	42.75	39.204	8.296	6371.9	5843.32	8.296
149.05	0.993	13.825	14.52	-5.026	42.75	39.207	8.287	6414.65	5883.05	8.287
150.05	0.993	13.825	14.521	-5.029	42.781	39.211	8.346	6462.09	5922.77	8.346
151.05	0.993	13.825	14.521	-5.034	42.781	39.214	8.338	6504.87	5962.52	8.338
152.05	0.993	13.826	14.522	-5.037	42.812	39.218	8.397	6552.43	6002.26	8.396
153.05	0.994	13.826	14.523	-5.041	42.812	39.221	8.389	6595.24	6041.96	8.389
154.05	0.994	13.826	14.523	-5.044	42.844	39.224	8.448	6642.94	6081.72	8.448
155.05	0.994	13.826	14.524	-5.048	42.844	39.228	8.441	6685.78	6121.43	8.441
156.05	0.994	13.826	14.524	-5.053	42.844	39.231	8.433	6728.62	6161.19	8.433
157.05	0.994	13.826	14.525	-5.055	42.876	39.234	8.494	6776.48	6200.93	8.493
158.05	0.994	13.826	14.526	-5.06	42.876	39.237	8.486	6819.35	6240.64	8.486
159.05	0.994	13.826	14.526	-5.062	42.908	39.24	8.547	6867.34	6280.36	8.547
160.05	0.994	13.826	14.527	-5.066	42.908	39.243	8.54	6910.25	6320.1	8.54
161.05	0.994	13.826	14.527	-5.07	42.908	39.246	8.533	6953.16	6359.84	8.533
162.05	0.994	13.826	14.528	-5.073	42.94	39.249	8.595	7001.31	6399.58	8.595
163.05	0.994	13.826	14.528	-5.077	42.94	39.252	8.588	7044.25	6439.3	8.588
164.05	0.994	13.826	14.529	-5.081	42.94	39.255	8.581	7087.19	6479.05	8.581
165.05	0.994	13.827	14.529	-5.083	42.972	39.258	8.643	7135.52	6518.77	8.643
166.05	0.994	13.827	14.53	-5.087	42.972	39.261	8.637	7178.49	6558.52	8.637
167.05	0.994	13.827	14.53	-5.091	42.972	39.264	8.63	7221.46	6598.21	8.631
168.05	0.994	13.827	14.531	-5.093	43.005	39.266	8.693	7269.96	6637.97	8.693
169.05	0.994	13.827	14.532	-5.097	43.005	39.269	8.687	7312.97	6677.73	8.687
170.05	0.994	13.827	14.532	-5.099	43.038	39.272	8.751	7361.61	6717.4	8.751
171.05	0.994	13.827	14.533	-5.102	43.038	39.274	8.744	7404.65	6757.13	8.745
172.05	0.994	13.827	14.533	-5.106	43.038	39.277	8.738	7447.69	6796.9	8.738

173.05	0.994	13.827	14.533	-5.108	43.071	39.28	8.803	7496.51	6836.63	8.803
174.05	0.994	13.827	14.534	-5.112	43.071	39.282	8.797	7539.58	6876.39	8.796
175.05	0.994	13.827	14.534	-5.115	43.071	39.285	8.791	7582.65	6916.09	8.791
176.05	0.994	13.827	14.535	-5.117	43.105	39.287	8.856	7631.66	6955.8	8.856
177.05	0.994	13.827	14.535	-5.12	43.105	39.29	8.85	7674.76	6995.52	8.85
178.05	0.994	13.827	14.536	-5.124	43.105	39.292	8.844	7717.87	7035.31	8.844
179.05	0.994	13.827	14.536	-5.127	43.105	39.295	8.839	7760.97	7075.01	8.839
180.05	0.994	13.828	14.537	-5.129	43.138	39.297	8.904	7810.2	7114.76	8.904
181.05	0.995	13.828	14.537	-5.132	43.138	39.3	8.899	7853.34	7154.5	8.899
182.05	0.995	13.828	14.538	-5.135	43.138	39.302	8.893	7896.47	7194.19	8.894
183.05	0.995	13.828	14.538	-5.137	43.172	39.304	8.96	7945.89	7233.93	8.96
184.05	0.995	13.828	14.538	-5.14	43.172	39.307	8.955	7989.06	7273.69	8.954
185.05	0.995	13.828	14.539	-5.143	43.172	39.309	8.949	8032.23	7313.4	8.949
186.05	0.995	13.828	14.539	-5.145	43.207	39.311	9.016	8081.84	7353.12	9.017
187.05	0.995	13.828	14.54	-5.148	43.207	39.313	9.011	8125.05	7392.86	9.012
188.05	0.995	13.828	14.54	-5.151	43.207	39.316	9.006	8168.25	7432.6	9.006
189.05	0.995	13.828	14.541	-5.153	43.207	39.318	9.001	8211.46	7472.33	9.001
190.05	0.995	13.828	14.541	-5.155	43.242	39.32	9.069	8261.3	7512.06	9.069
191.05	0.995	13.828	14.541	-5.158	43.242	39.322	9.064	8304.54	7551.77	9.065
192.05	0.995	13.828	14.542	-5.161	43.242	39.324	9.059	8347.78	7591.55	9.059
193.05	0.995	13.828	14.542	-5.164	43.242	39.326	9.054	8391.02	7631.29	9.054
194.05	0.995	13.828	14.543	-5.165	43.277	39.328	9.123	8441.1	7671	9.123
195.05	0.995	13.828	14.543	-5.168	43.277	39.331	9.118	8484.37	7710.76	9.118
196.05	0.995	13.828	14.543	-5.17	43.277	39.333	9.114	8527.65	7750.46	9.114
197.05	0.995	13.828	14.544	-5.172	43.312	39.335	9.183	8577.93	7790.21	9.183
198.05	0.995	13.828	14.544	-5.175	43.312	39.337	9.179	8621.24	7829.98	9.178
199.05	0.995	13.828	14.544	-5.177	43.312	39.339	9.174	8664.55	7869.68	9.174
200.05	0.995	13.828	14.545	-5.18	43.312	39.341	9.169	8707.86	7909.4	9.169
201.05	0.995	13.829	14.545	-5.181	43.348	39.342	9.24	8758.39	7949.13	9.24
202.05	0.995	13.829	14.545	-5.184	43.348	39.344	9.235	8801.73	7988.87	9.235
203.05	0.995	13.829	14.546	-5.186	43.348	39.346	9.231	8845.08	8028.61	9.231
204.05	0.995	13.829	14.546	-5.189	43.348	39.348	9.227	8888.43	8068.35	9.226
205.05	0.995	13.829	14.547	-5.191	43.348	39.35	9.222	8931.78	8108.07	9.222
206.05	0.995	13.829	14.547	-5.192	43.384	39.352	9.293	8982.58	8147.78	9.294
207.05	0.995	13.829	14.547	-5.195	43.384	39.354	9.289	9025.97	8187.56	9.289
208.05	0.995	13.829	14.548	-5.197	43.384	39.356	9.285	9069.35	8227.22	9.285
209.05	0.995	13.829	14.548	-5.2	43.384	39.357	9.281	9112.73	8267.05	9.28
210.05	0.995	13.829	14.548	-5.201	43.42	39.359	9.353	9163.8	8306.73	9.353
211.05	0.995	13.829	14.549	-5.203	43.42	39.361	9.349	9207.22	8346.48	9.349
212.05	0.995	13.829	14.549	-5.205	43.42	39.363	9.345	9250.64	8386.17	9.345
213.05	0.995	13.829	14.549	-5.208	43.42	39.364	9.341	9294.06	8425.92	9.341
214.05	0.995	13.829	14.549	-5.21	43.42	39.366	9.337	9337.48	8465.71	9.336
215.05	0.995	13.829	14.55	-5.211	43.457	39.368	9.41	9388.84	8505.43	9.409

216.05	0.995	13.829	14.55	-5.213	43.457	39.369	9.406	9432.3	8545.08	9.406
217.05	0.995	13.829	14.55	-5.216	43.457	39.371	9.402	9475.75	8584.87	9.402
218.05	0.995	13.829	14.551	-5.218	43.457	39.373	9.398	9519.21	8624.57	9.398
219.05	0.995	13.829	14.551	-5.219	43.494	39.374	9.472	9570.84	8664.3	9.472
220.05	0.995	13.829	14.551	-5.221	43.494	39.376	9.468	9614.33	8704.04	9.468
221.05	0.995	13.829	14.552	-5.223	43.494	39.378	9.464	9657.82	8743.8	9.464
222.05	0.996	13.829	14.552	-5.225	43.494	39.379	9.46	9701.32	8783.56	9.46
223.05	0.996	13.829	14.552	-5.227	43.494	39.381	9.457	9744.81	8823.21	9.457
224.05	0.996	13.83	14.553	-5.228	43.531	39.382	9.531	9796.75	8862.97	9.531
225.05	0.996	13.83	14.553	-5.23	43.531	39.384	9.528	9840.28	8902.73	9.528
226.05	0.996	13.83	14.553	-5.232	43.531	39.385	9.524	9883.81	8942.48	9.524
227.05	0.996	13.83	14.553	-5.234	43.531	39.387	9.521	9927.34	8982.21	9.521
228.05	0.996	13.83	14.554	-5.236	43.531	39.389	9.517	9970.88	9021.92	9.517
229.05	0.996	13.83	14.554	-5.237	43.569	39.39	9.593	10023.1	9061.6	9.593
230.05	0.996	13.83	14.554	-5.239	43.569	39.391	9.589	10066.7	9101.38	9.589
231.05	0.996	13.83	14.554	-5.241	43.569	39.393	9.586	10110.3	9141.12	9.586
232.05	0.996	13.83	14.555	-5.243	43.569	39.394	9.582	10153.8	9180.83	9.583
233.05	0.996	13.83	14.555	-5.245	43.569	39.396	9.579	10197.4	9220.62	9.579
234.05	0.996	13.83	14.555	-5.247	43.569	39.397	9.576	10241	9260.35	9.575
235.05	0.996	13.83	14.556	-5.247	43.608	39.399	9.652	10293.6	9300.04	9.652
236.05	0.996	13.83	14.556	-5.249	43.608	39.4	9.649	10337.2	9339.79	9.649
237.05	0.996	13.83	14.556	-5.251	43.608	39.402	9.646	10380.8	9379.48	9.646
238.05	0.996	13.83	14.556	-5.253	43.608	39.403	9.642	10424.4	9419.24	9.643
239.05	0.996	13.83	14.557	-5.255	43.608	39.404	9.639	10468	9458.92	9.64
240.05	0.996	13.83	14.557	-5.255	43.647	39.406	9.716	10521	9498.66	9.717
241.05	0.996	13.83	14.557	-5.257	43.647	39.407	9.713	10564.6	9538.46	9.713
242.05	0.996	13.83	14.557	-5.259	43.647	39.408	9.71	10608.3	9578.17	9.71
243.05	0.996	13.83	14.558	-5.261	43.647	39.41	9.707	10651.9	9617.92	9.707
244.05	0.996	13.83	14.558	-5.263	43.647	39.411	9.704	10695.6	9657.72	9.703
245.05	0.996	13.83	14.558	-5.264	43.647	39.412	9.701	10739.2	9697.42	9.701
246.05	0.996	13.83	14.558	-5.265	43.686	39.414	9.779	10792.5	9737.15	9.779
247.05	0.996	13.83	14.559	-5.267	43.686	39.415	9.776	10836.2	9776.92	9.776
248.05	0.996	13.83	14.559	-5.268	43.686	39.416	9.773	10879.9	9816.57	9.774
249.05	0.996	13.83	14.559	-5.27	43.686	39.417	9.77	10923.6	9856.39	9.77
250.05	0.996	13.83	14.559	-5.272	43.686	39.419	9.768	10967.3	9896.08	9.767
251.05	0.996	13.83	14.559	-5.273	43.686	39.42	9.765	11011	9935.8	9.765
252.05	0.996	13.83	14.56	-5.275	43.686	39.421	9.762	11054.7	9975.52	9.762
253.05	0.996	13.83	14.56	-5.276	43.725	39.422	9.841	11108.4	10015.3	9.841
254.05	0.996	13.83	14.56	-5.277	43.725	39.424	9.838	11152.1	10055	9.838
255.05	0.996	13.83	14.56	-5.279	43.725	39.425	9.835	11195.9	10094.8	9.835
256.05	0.996	13.83	14.561	-5.28	43.725	39.426	9.833	11239.6	10134.5	9.832
257.05	0.996	13.83	14.561	-5.282	43.725	39.427	9.83	11283.3	10174.2	9.829
258.05	0.996	13.83	14.561	-5.284	43.725	39.428	9.827	11327	10214	9.827

259.05	0.996	13.83	14.561	-5.284	43.766	39.43	9.907	11381.2	10253.7	9.907
260.05	0.996	13.83	14.561	-5.285	43.766	39.431	9.905	11425	10293.4	9.904
261.05	0.996	13.83	14.562	-5.287	43.766	39.432	9.902	11468.7	10333.1	9.902
262.05	0.996	13.83	14.562	-5.289	43.766	39.433	9.899	11512.5	10372.8	9.9
263.05	0.996	13.83	14.562	-5.29	43.766	39.434	9.897	11556.3	10412.6	9.897
264.05	0.996	13.83	14.562	-5.292	43.766	39.435	9.894	11600	10452.4	9.894
265.05	0.996	13.83	14.563	-5.293	43.766	39.436	9.892	11643.8	10492.1	9.891
266.05	0.996	13.831	14.563	-5.293	43.806	39.438	9.973	11698.4	10531.8	9.972
267.05	0.996	13.831	14.563	-5.295	43.806	39.439	9.97	11742.2	10571.5	9.97
268.05	0.996	13.831	14.563	-5.296	43.806	39.44	9.968	11786	10611.3	9.967
269.05	0.996	13.831	14.563	-5.298	43.806	39.441	9.965	11829.8	10651	9.965
270.05	0.996	13.831	14.564	-5.299	43.806	39.442	9.963	11873.6	10690.7	9.962
271.05	0.996	13.831	14.564	-5.301	43.806	39.443	9.96	11917.5	10730.4	9.961
272.05	0.996	13.831	14.564	-5.302	43.806	39.444	9.958	11961.3	10770.1	9.958
273.05	0.996	13.831	14.564	-5.302	43.847	39.445	10.04	12016.3	10809.8	10.041
274.05	0.996	13.831	14.564	-5.304	43.847	39.446	10.037	12060.2	10849.7	10.038
275.05	0.996	13.831	14.565	-5.305	43.847	39.447	10.035	12104	10889.4	10.035
276.05	0.996	13.831	14.565	-5.307	43.847	39.448	10.033	12147.9	10929.1	10.033
277.05	0.996	13.831	14.565	-5.308	43.847	39.449	10.03	12191.7	10968.8	10.031
278.05	0.996	13.831	14.565	-5.309	43.847	39.45	10.028	12235.6	11008.5	10.029
279.05	0.996	13.831	14.565	-5.311	43.847	39.451	10.026	12279.4	11048.3	10.026
280.05	0.996	13.831	14.565	-5.312	43.847	39.452	10.023	12323.3	11088	10.024
281.05	0.996	13.831	14.566	-5.312	43.889	39.453	10.107	12378.9	11127.8	10.106
282.05	0.996	13.831	14.566	-5.314	43.889	39.454	10.104	12422.8	11167.5	10.104
283.05	0.996	13.831	14.566	-5.315	43.889	39.455	10.102	12466.7	11207.3	10.102
284.05	0.996	13.831	14.566	-5.316	43.889	39.456	10.1	12510.5	11247	10.1
285.05	0.997	13.831	14.566	-5.317	43.889	39.457	10.098	12554.4	11286.8	10.097
286.05	0.997	13.831	14.567	-5.319	43.889	39.458	10.096	12598.3	11326.5	10.096
287.05	0.997	13.831	14.567	-5.32	43.889	39.459	10.093	12642.2	11366.2	10.093
288.05	0.997	13.831	14.567	-5.321	43.889	39.46	10.091	12686.1	11405.9	10.092
289.05	0.997	13.831	14.567	-5.321	43.931	39.461	10.175	12742.2	11445.8	10.175
290.05	0.997	13.831	14.567	-5.323	43.931	39.462	10.173	12786.2	11485.3	10.174
291.05	0.997	13.831	14.567	-5.324	43.931	39.463	10.171	12830.1	11525.2	10.171
292.05	0.997	13.831	14.568	-5.325	43.931	39.464	10.169	12874	11564.9	10.169
293.05	0.997	13.831	14.568	-5.326	43.931	39.465	10.167	12918	11604.5	10.168
294.05	0.997	13.831	14.568	-5.328	43.931	39.466	10.165	12961.9	11644.4	10.165
295.05	0.997	13.831	14.568	-5.329	43.931	39.467	10.163	13005.8	11684.1	10.163
296.05	0.997	13.831	14.568	-5.33	43.931	39.467	10.161	13049.8	11723.9	10.16
297.05	0.997	13.831	14.568	-5.331	43.931	39.468	10.159	13093.7	11763.5	10.159
298.05	0.997	13.831	14.569	-5.331	43.974	39.469	10.244	13150.4	11803.2	10.245
299.05	0.997	13.831	14.569	-5.332	43.974	39.47	10.242	13194.4	11842.9	10.243
300.05	0.997	13.831	14.569	-5.334	43.974	39.471	10.24	13238.4	11882.7	10.24
301.05	0.997	13.831	14.569	-5.335	43.974	39.472	10.238	13282.3	11922.4	10.239

302.05	0.997	13.831	14.569	-5.336	43.974	39.473	10.236	13326.3	11962.2	10.236
303.05	0.997	13.831	14.569	-5.337	43.974	39.474	10.234	13370.3	12002	10.234
304.05	0.997	13.831	14.57	-5.338	43.974	39.474	10.232	13414.3	12041.7	10.232
305.05	0.997	13.831	14.57	-5.339	43.974	39.475	10.231	13458.2	12081.3	10.231
306.05	0.997	13.831	14.57	-5.341	43.974	39.476	10.229	13502.2	12121.1	10.229
307.05	0.997	13.831	14.57	-5.341	44.017	39.477	10.315	13559.6	12160.8	10.316
308.05	0.997	13.831	14.57	-5.342	44.017	39.478	10.313	13603.6	12200.7	10.313
309.05	0.997	13.831	14.57	-5.343	44.017	39.479	10.311	13647.6	12240.4	10.311
310.05	0.997	13.831	14.57	-5.344	44.017	39.479	10.31	13691.6	12280.1	10.309
311.05	0.997	13.831	14.571	-5.345	44.017	39.48	10.308	13735.6	12319.7	10.309
312.05	0.997	13.831	14.571	-5.346	44.017	39.481	10.306	13779.6	12359.5	10.306
313.05	0.997	13.831	14.571	-5.347	44.017	39.482	10.304	13823.7	12399.3	10.304
314.05	0.997	13.831	14.571	-5.348	44.017	39.483	10.302	13867.7	12438.9	10.303
315.05	0.997	13.831	14.571	-5.349	44.017	39.483	10.3	13911.7	12478.7	10.3
316.05	0.997	13.831	14.571	-5.35	44.017	39.484	10.299	13955.7	12518.4	10.299
317.05	0.997	13.831	14.572	-5.35	44.061	39.485	10.387	14013.7	12558.3	10.386
318.05	0.997	13.831	14.572	-5.351	44.061	39.486	10.385	14057.8	12597.9	10.385
319.05	0.997	13.831	14.572	-5.352	44.061	39.487	10.383	14101.9	12637.6	10.384
320.05	0.997	13.831	14.572	-5.353	44.061	39.487	10.381	14145.9	12677.5	10.381
321.05	0.997	13.831	14.572	-5.354	44.061	39.488	10.38	14190	12717.2	10.379
322.05	0.997	13.831	14.572	-5.355	44.061	39.489	10.378	14234	12756.8	10.378
323.05	0.997	13.831	14.572	-5.356	44.061	39.49	10.376	14278.1	12796.5	10.377
324.05	0.997	13.831	14.573	-5.357	44.061	39.49	10.374	14322.2	12836.4	10.374
325.05	0.997	13.831	14.573	-5.358	44.061	39.491	10.373	14366.2	12876.1	10.373
326.05	0.997	13.831	14.573	-5.359	44.061	39.492	10.371	14410.3	12915.7	10.372
327.05	0.997	13.832	14.573	-5.359	44.106	39.493	10.46	14469	12955.6	10.46
328.05	0.997	13.832	14.573	-5.36	44.106	39.493	10.458	14513.1	12995.2	10.459
329.05	0.997	13.832	14.573	-5.361	44.106	39.494	10.457	14557.2	13035.1	10.456
330.05	0.997	13.832	14.573	-5.362	44.106	39.495	10.455	14601.3	13074.7	10.456
331.05	0.997	13.832	14.573	-5.363	44.106	39.496	10.454	14645.4	13114.5	10.453
332.05	0.997	13.832	14.574	-5.364	44.106	39.496	10.452	14689.5	13154.3	10.451
333.05	0.997	13.832	14.574	-5.365	44.106	39.497	10.45	14733.7	13193.9	10.451
334.05	0.997	13.832	14.574	-5.366	44.106	39.498	10.449	14777.8	13233.6	10.449
335.05	0.997	13.832	14.574	-5.367	44.106	39.498	10.447	14821.9	13273.3	10.448
336.05	0.997	13.832	14.574	-5.368	44.106	39.499	10.446	14866	13313	10.446
337.05	0.997	13.832	14.574	-5.369	44.106	39.5	10.444	14910.1	13353	10.443
338.05	0.997	13.832	14.574	-5.369	44.152	39.5	10.534	14969.6	13392.6	10.534
339.05	0.997	13.832	14.574	-5.37	44.152	39.501	10.533	15013.7	13432.5	10.532
340.05	0.997	13.832	14.575	-5.371	44.152	39.502	10.531	15057.9	13472	10.532
341.05	0.997	13.832	14.575	-5.372	44.152	39.502	10.53	15102	13511.8	10.53
342.05	0.997	13.832	14.575	-5.372	44.152	39.503	10.528	15146.2	13551.6	10.528
343.05	0.997	13.832	14.575	-5.373	44.152	39.504	10.527	15190.3	13591.2	10.527
344.05	0.997	13.832	14.575	-5.374	44.152	39.505	10.525	15234.5	13630.9	10.526

345.05	0.997	13.832	14.575	-5.375	44.152	39.505	10.524	15278.6	13670.8	10.524
346.05	0.997	13.832	14.575	-5.376	44.152	39.506	10.522	15322.8	13710.6	10.522
347.05	0.997	13.832	14.575	-5.377	44.152	39.506	10.521	15366.9	13750.3	10.52
348.05	0.997	13.832	14.576	-5.378	44.152	39.507	10.519	15411.1	13790.1	10.519
349.05	0.997	13.832	14.576	-5.379	44.152	39.508	10.518	15455.2	13829.7	10.518
350.05	0.997	13.832	14.576	-5.378	44.198	39.508	10.61	15515.6	13869.3	10.611
351.05	0.997	13.832	14.576	-5.379	44.198	39.509	10.608	15559.8	13909.1	10.609
352.05	0.997	13.832	14.576	-5.38	44.198	39.51	10.607	15604	13948.8	10.607
353.05	0.997	13.832	14.576	-5.381	44.198	39.51	10.605	15648.2	13988.5	10.606
354.05	0.997	13.832	14.576	-5.382	44.198	39.511	10.604	15692.4	14028.4	10.604
355.05	0.997	13.832	14.576	-5.383	44.198	39.512	10.603	15736.6	14068.2	10.602
356.05	0.997	13.832	14.577	-5.384	44.198	39.512	10.601	15780.7	14107.9	10.6
357.05	0.997	13.832	14.577	-5.384	44.198	39.513	10.6	15824.9	14147.6	10.599
358.05	0.997	13.832	14.577	-5.385	44.198	39.513	10.598	15869.1	14187.2	10.599
359.05	0.997	13.832	14.577	-5.386	44.198	39.514	10.597	15913.3	14227	10.597
360.05	0.997	13.832	14.577	-5.387	44.198	39.515	10.596	15957.5	14266.7	10.596
361.05	0.997	13.832	14.577	-5.388	44.198	39.515	10.594	16001.7	14306.3	10.595
362.05	0.997	13.832	14.577	-5.388	44.198	39.516	10.593	16045.9	14346.2	10.593
363.05	0.997	13.832	14.577	-5.388	44.244	39.516	10.686	16107.2	14385.9	10.686
364.05	0.997	13.832	14.577	-5.389	44.244	39.517	10.685	16151.4	14425.6	10.685
365.05	0.997	13.832	14.578	-5.39	44.244	39.518	10.683	16195.7	14465.5	10.683
366.05	0.997	13.832	14.578	-5.391	44.244	39.518	10.682	16239.9	14505.2	10.682
367.05	0.997	13.832	14.578	-5.391	44.244	39.519	10.681	16284.2	14544.9	10.681
368.05	0.997	13.832	14.578	-5.392	44.244	39.519	10.679	16328.4	14584.5	10.68
369.05	0.997	13.832	14.578	-5.393	44.244	39.52	10.678	16372.7	14624.3	10.679
370.05	0.997	13.832	14.578	-5.394	44.244	39.521	10.677	16416.9	14663.9	10.678
371.05	0.997	13.832	14.578	-5.394	44.244	39.521	10.676	16461.1	14703.8	10.676
372.05	0.997	13.832	14.578	-5.395	44.244	39.522	10.674	16505.4	14743.6	10.674
373.05	0.997	13.832	14.578	-5.396	44.244	39.522	10.673	16549.6	14783.3	10.673
374.05	0.997	13.832	14.578	-5.397	44.244	39.523	10.672	16593.9	14823.1	10.671
375.05	0.997	13.832	14.579	-5.398	44.244	39.523	10.67	16638.1	14862.9	10.67
376.05	0.997	13.832	14.579	-5.398	44.244	39.524	10.669	16682.4	14902.5	10.669
377.05	0.997	13.832	14.579	-5.398	44.292	39.525	10.764	16744.6	14942.3	10.763
378.05	0.997	13.832	14.579	-5.399	44.292	39.525	10.763	16788.9	14982	10.762
379.05	0.997	13.832	14.579	-5.399	44.292	39.526	10.762	16833.2	15021.6	10.762
380.05	0.997	13.832	14.579	-5.4	44.292	39.526	10.76	16877.5	15061.4	10.76
381.05	0.997	13.832	14.579	-5.401	44.292	39.527	10.759	16921.8	15101	10.76
382.05	0.997	13.832	14.579	-5.402	44.292	39.527	10.758	16966.1	15140.9	10.758
383.05	0.997	13.832	14.579	-5.402	44.292	39.528	10.757	17010.4	15180.6	10.757
384.05	0.997	13.832	14.58	-5.403	44.292	39.528	10.755	17054.7	15220.2	10.756
385.05	0.997	13.832	14.58	-5.404	44.292	39.529	10.754	17098.9	15260	10.755
386.05	0.997	13.832	14.58	-5.405	44.292	39.529	10.753	17143.2	15300	10.752
387.05	0.997	13.832	14.58	-5.405	44.292	39.53	10.752	17187.5	15339.5	10.753

388.05	0.997	13.832	14.58	-5.406	44.292	39.53	10.751	17231.8	15379.1	10.752
389.05	0.997	13.832	14.58	-5.407	44.292	39.531	10.749	17276.1	15419	10.749
390.05	0.997	13.832	14.58	-5.407	44.292	39.531	10.748	17320.4	15458.8	10.748
391.05	0.997	13.832	14.58	-5.408	44.292	39.532	10.747	17364.7	15498.3	10.748
392.05	0.997	13.832	14.58	-5.408	44.341	39.533	10.844	17428	15538.1	10.844
393.05	0.997	13.832	14.58	-5.408	44.341	39.533	10.842	17472.4	15578.1	10.842
394.05	0.997	13.832	14.58	-5.409	44.341	39.534	10.841	17516.7	15617.6	10.842
395.05	0.997	13.832	14.581	-5.41	44.341	39.534	10.84	17561.1	15657.6	10.839
396.05	0.997	13.832	14.581	-5.41	44.341	39.535	10.839	17605.4	15697	10.84
397.05	0.997	13.832	14.581	-5.411	44.341	39.535	10.838	17649.7	15736.7	10.839
398.05	0.997	13.832	14.581	-5.412	44.341	39.536	10.837	17694.1	15776.6	10.837
399.05	0.998	13.832	14.581	-5.412	44.341	39.536	10.836	17738.4	15816.3	10.836
400.05	0.998	13.832	14.581	-5.413	44.341	39.537	10.834	17782.8	15856.2	10.834
401.05	0.998	13.832	14.581	-5.414	44.341	39.537	10.833	17827.1	15895.9	10.833
402.05	0.998	13.832	14.581	-5.414	44.341	39.538	10.832	17871.4	15935.4	10.833
403.05	0.998	13.832	14.581	-5.415	44.341	39.538	10.831	17915.8	15975.2	10.832
404.05	0.998	13.832	14.581	-5.416	44.341	39.538	10.83	17960.1	16015.1	10.83
405.05	0.998	13.832	14.581	-5.416	44.341	39.539	10.829	18004.5	16054.8	10.829
406.05	0.998	13.832	14.582	-5.417	44.341	39.539	10.828	18048.8	16094.4	10.829
407.05	0.998	13.832	14.582	-5.418	44.341	39.54	10.827	18093.1	16134.1	10.828
408.05	0.998	13.832	14.582	-5.417	44.39	39.54	10.925	18157.7	16174	10.925
409.05	0.998	13.832	14.582	-5.418	44.39	39.541	10.924	18202.1	16213.7	10.924
410.05	0.998	13.832	14.582	-5.419	44.39	39.541	10.923	18246.4	16253.3	10.924
411.05	0.998	13.832	14.582	-5.419	44.39	39.542	10.922	18290.8	16293.4	10.921
412.05	0.998	13.832	14.582	-5.42	44.39	39.542	10.921	18335.2	16332.9	10.921
413.05	0.998	13.832	14.582	-5.42	44.39	39.543	10.92	18379.6	16372.6	10.92
414.05	0.998	13.832	14.582	-5.421	44.39	39.543	10.919	18424	16412.4	10.918
415.05	0.998	13.832	14.582	-5.422	44.39	39.544	10.918	18468.4	16452.1	10.918
416.05	0.998	13.832	14.582	-5.422	44.39	39.544	10.916	18512.8	16492	10.916
417.05	0.998	13.832	14.583	-5.423	44.39	39.545	10.915	18557.2	16531.6	10.915
418.05	0.998	13.832	14.583	-5.424	44.39	39.545	10.914	18601.6	16571.4	10.914
419.05	0.998	13.832	14.583	-5.424	44.39	39.545	10.913	18646	16611.1	10.913
420.05	0.998	13.832	14.583	-5.425	44.39	39.546	10.912	18690.3	16650.8	10.912
421.05	0.998	13.832	14.583	-5.425	44.39	39.546	10.911	18734.7	16690.4	10.912
422.05	0.998	13.832	14.583	-5.426	44.39	39.547	10.91	18779.1	16730.2	10.911
423.05	0.998	13.832	14.583	-5.426	44.39	39.547	10.909	18823.5	16770.1	10.909
424.05	0.998	13.832	14.583	-5.427	44.39	39.548	10.908	18867.9	16809.8	10.908
425.05	0.998	13.833	14.583	-5.427	44.44	39.548	11.008	18933.7	16849.2	11.009
426.05	0.998	13.833	14.583	-5.427	44.44	39.549	11.007	18978.1	16889.3	11.007
427.05	0.998	13.833	14.583	-5.428	44.44	39.549	11.006	19022.6	16928.7	11.007
428.05	0.998	13.833	14.583	-5.428	44.44	39.549	11.005	19067	16968.7	11.005
429.05	0.998	13.833	14.583	-5.429	44.44	39.55	11.004	19111.5	17008.5	11.004
430.05	0.998	13.833	14.584	-5.43	44.44	39.55	11.003	19155.9	17048	11.004

431.05	0.998	13.833	14.584	-5.43	44.44	39.551	11.002	19200.3	17087.7	11.003
432.05	0.998	13.833	14.584	-5.431	44.44	39.551	11.001	19244.8	17127.6	11.001
433.05	0.998	13.833	14.584	-5.431	44.44	39.552	11.001	19289.2	17167.2	11.001
434.05	0.998	13.833	14.584	-5.432	44.44	39.552	11	19333.7	17207	11
435.05	0.998	13.833	14.584	-5.432	44.44	39.552	10.999	19378.1	17247	10.998
436.05	0.998	13.833	14.584	-5.433	44.44	39.553	10.998	19422.6	17286.7	10.997
437.05	0.998	13.833	14.584	-5.434	44.44	39.553	10.997	19467	17326.2	10.997
438.05	0.998	13.833	14.584	-5.434	44.44	39.554	10.996	19511.4	17365.8	10.997
439.05	0.998	13.833	14.584	-5.435	44.44	39.554	10.995	19555.9	17405.6	10.996
440.05	0.998	13.833	14.584	-5.435	44.44	39.554	10.994	19600.3	17445.6	10.993
441.05	0.998	13.833	14.584	-5.436	44.44	39.555	10.993	19644.8	17485.3	10.993
442.05	0.998	13.833	14.584	-5.436	44.44	39.555	10.992	19689.2	17524.7	10.993
443.05	0.998	13.833	14.585	-5.437	44.44	39.556	10.991	19733.6	17564.8	10.991
444.05	0.998	13.833	14.585	-5.436	44.491	39.556	11.093	19800.9	17604.6	11.092
445.05	0.998	13.833	14.585	-5.437	44.491	39.556	11.092	19845.4	17644.1	11.092
446.05	0.998	13.833	14.585	-5.438	44.491	39.557	11.091	19889.9	17683.7	11.092
447.05	0.998	13.833	14.585	-5.438	44.491	39.557	11.09	19934.3	17723.6	11.09
448.05	0.998	13.833	14.585	-5.439	44.491	39.558	11.089	19978.8	17763.1	11.09
449.05	0.998	13.833	14.585	-5.439	44.491	39.558	11.088	20023.3	17802.9	11.089
450.05	0.998	13.833	14.585	-5.44	44.491	39.558	11.088	20067.8	17842.8	11.088
451.05	0.998	13.833	14.585	-5.44	44.491	39.559	11.087	20112.3	17882.4	11.088
452.05	0.998	13.833	14.585	-5.441	44.491	39.559	11.086	20156.8	17922.1	11.086
453.05	0.998	13.833	14.585	-5.441	44.491	39.56	11.085	20201.3	17962.1	11.085
454.05	0.998	13.833	14.585	-5.442	44.491	39.56	11.084	20245.8	18001.7	11.084
455.05	0.998	13.833	14.585	-5.442	44.491	39.56	11.083	20290.3	18041.5	11.083
456.05	0.998	13.833	14.585	-5.443	44.491	39.561	11.082	20334.8	18081	11.083
457.05	0.998	13.833	14.586	-5.443	44.491	39.561	11.081	20379.3	18121.2	11.08
458.05	0.998	13.833	14.586	-5.444	44.491	39.561	11.081	20423.8	18160.5	11.081
459.05	0.998	13.833	14.586	-5.444	44.491	39.562	11.08	20468.2	18200.5	11.079
460.05	0.998	13.833	14.586	-5.445	44.491	39.562	11.079	20512.7	18240.2	11.079
461.05	0.998	13.833	14.586	-5.445	44.491	39.563	11.078	20557.2	18280.1	11.077
462.05	0.998	13.833	14.586	-5.446	44.491	39.563	11.077	20601.7	18319.6	11.077
463.05	0.998	13.833	14.586	-5.446	44.491	39.563	11.076	20646.2	18359.3	11.077
464.05	0.998	13.833	14.586	-5.447	44.491	39.564	11.076	20690.7	18399.2	11.075
465.05	0.998	13.833	14.586	-5.446	44.544	39.564	11.179	20759.6	18438.7	11.18
466.05	0.998	13.833	14.586	-5.447	44.544	39.564	11.178	20804.1	18478.4	11.179
467.05	0.998	13.833	14.586	-5.447	44.544	39.565	11.178	20848.6	18518.2	11.178
468.05	0.998	13.833	14.586	-5.448	44.544	39.565	11.177	20893.2	18557.8	11.178
469.05	0.998	13.833	14.586	-5.448	44.544	39.566	11.176	20937.7	18598	11.175
470.05	0.998	13.833	14.586	-5.449	44.544	39.566	11.175	20982.3	18637.3	11.176
471.05	0.998	13.833	14.587	-5.449	44.544	39.566	11.174	21026.8	18677.3	11.174
472.05	0.998	13.833	14.587	-5.45	44.544	39.567	11.174	21071.4	18717	11.173
473.05	0.998	13.833	14.587	-5.45	44.544	39.567	11.173	21115.9	18756.8	11.172

474.05	0.998	13.833	14.587	-5.451	44.544	39.567	11.172	21160.4	18796.3	11.173
475.05	0.998	13.833	14.587	-5.451	44.544	39.568	11.171	21205	18835.9	11.172
476.05	0.998	13.833	14.587	-5.452	44.544	39.568	11.17	21249.5	18875.7	11.171
477.05	0.998	13.833	14.587	-5.452	44.544	39.568	11.17	21294.1	18915.7	11.169
478.05	0.998	13.833	14.587	-5.452	44.544	39.569	11.169	21338.6	18955.3	11.169
479.05	0.998	13.833	14.587	-5.453	44.544	39.569	11.168	21383.2	18995	11.168
480.05	0.998	13.833	14.587	-5.453	44.544	39.569	11.167	21427.7	19035	11.167
481.05	0.998	13.833	14.587	-5.454	44.544	39.57	11.167	21472.3	19074.5	11.167
482.05	0.998	13.833	14.587	-5.454	44.544	39.57	11.166	21516.8	19114.2	11.166
483.05	0.998	13.833	14.587	-5.455	44.544	39.57	11.165	21561.3	19154.1	11.165
484.05	0.998	13.833	14.587	-5.455	44.544	39.571	11.164	21605.9	19193.6	11.165
485.05	0.998	13.833	14.587	-5.456	44.544	39.571	11.163	21650.4	19233.8	11.162
486.05	0.998	13.833	14.587	-5.456	44.544	39.571	11.163	21695	19273	11.164
487.05	0.998	13.833	14.588	-5.456	44.597	39.572	11.268	21765.6	19313	11.268
488.05	0.998	13.833	14.588	-5.456	44.597	39.572	11.268	21810.2	19352.5	11.268
489.05	0.998	13.833	14.588	-5.457	44.597	39.572	11.267	21854.8	19392.3	11.268
490.05	0.998	13.833	14.588	-5.457	44.597	39.573	11.266	21899.4	19432.2	11.266
491.05	0.998	13.833	14.588	-5.457	44.597	39.573	11.265	21944	19471.7	11.266
492.05	0.998	13.833	14.588	-5.458	44.597	39.573	11.265	21988.6	19511.9	11.264
493.05	0.998	13.833	14.588	-5.458	44.597	39.574	11.264	22033.2	19551.1	11.265
494.05	0.998	13.833	14.588	-5.459	44.597	39.574	11.263	22077.7	19591.1	11.263
495.05	0.998	13.833	14.588	-5.459	44.597	39.574	11.262	22122.3	19630.6	11.263
496.05	0.998	13.833	14.588	-5.46	44.597	39.575	11.262	22166.9	19670.3	11.263
497.05	0.998	13.833	14.588	-5.46	44.597	39.575	11.261	22211.5	19710.2	11.262
498.05	0.998	13.833	14.588	-5.46	44.597	39.575	11.26	22256.1	19750.2	11.259
499.05	0.998	13.833	14.588	-5.461	44.597	39.576	11.26	22300.7	19789.8	11.259
500.05	0.998	13.833	14.588	-5.461	44.597	39.576	11.259	22345.3	19829.6	11.259
501.05	0.998	13.833	14.588	-5.462	44.597	39.576	11.258	22389.9	19869.5	11.257
502.05	0.998	13.833	14.588	-5.462	44.597	39.577	11.257	22434.5	19909	11.257
503.05	0.998	13.833	14.588	-5.463	44.597	39.577	11.257	22479.1	19948.6	11.257
504.05	0.998	13.833	14.589	-5.463	44.597	39.577	11.256	22523.7	19988.4	11.256
505.05	0.998	13.833	14.589	-5.463	44.597	39.578	11.255	22568.3	20028.3	11.255
506.05	0.998	13.833	14.589	-5.464	44.597	39.578	11.255	22612.9	20067.8	11.255
507.05	0.998	13.833	14.589	-5.464	44.597	39.578	11.254	22657.5	20107.5	11.255
508.05	0.998	13.833	14.589	-5.465	44.597	39.578	11.253	22702.1	20147.3	11.254
509.05	0.998	13.833	14.589	-5.465	44.597	39.579	11.253	22746.7	20187.3	11.252
510.05	0.998	13.833	14.589	-5.465	44.597	39.579	11.252	22791.3	20226.8	11.252
511.05	0.998	13.833	14.589	-5.466	44.597	39.579	11.251	22835.9	20266.5	11.252
512.05	0.998	13.833	14.589	-5.465	44.652	39.58	11.359	22908.5	20306.3	11.359
513.05	0.998	13.833	14.589	-5.466	44.652	39.58	11.358	22953.1	20346.2	11.357
514.05	0.998	13.833	14.589	-5.466	44.652	39.58	11.358	22997.8	20385.8	11.358
515.05	0.998	13.833	14.589	-5.467	44.652	39.581	11.357	23042.4	20425.4	11.357
516.05	0.998	13.833	14.589	-5.467	44.652	39.581	11.356	23087.1	20465.2	11.356

517.05	0.998	13.833	14.589	-5.467	44.652	39.581	11.356	23131.7	20505.2	11.355
518.05	0.998	13.833	14.589	-5.468	44.652	39.581	11.355	23176.4	20544.7	11.355
519.05	0.998	13.833	14.589	-5.468	44.652	39.582	11.354	23221	20584.3	11.355
520.05	0.998	13.833	14.589	-5.469	44.652	39.582	11.354	23265.7	20624.1	11.354
521.05	0.998	13.833	14.589	-5.469	44.652	39.582	11.353	23310.3	20664	11.353
522.05	0.998	13.833	14.59	-5.469	44.652	39.583	11.352	23355	20703.5	11.353
523.05	0.998	13.833	14.59	-5.47	44.652	39.583	11.352	23399.7	20743.1	11.353
524.05	0.998	13.833	14.59	-5.47	44.652	39.583	11.351	23444.3	20782.8	11.352
525.05	0.998	13.833	14.59	-5.471	44.652	39.583	11.35	23489	20822.7	11.351
526.05	0.998	13.833	14.59	-5.471	44.652	39.584	11.35	23533.6	20862.8	11.349
527.05	0.998	13.833	14.59	-5.471	44.652	39.584	11.349	23578.3	20902.3	11.349
528.05	0.998	13.833	14.59	-5.472	44.652	39.584	11.349	23622.9	20942	11.349
529.05	0.998	13.833	14.59	-5.472	44.652	39.585	11.348	23667.6	20981.9	11.348
530.05	0.998	13.833	14.59	-5.472	44.652	39.585	11.347	23712.2	21021.2	11.349
531.05	0.998	13.833	14.59	-5.473	44.652	39.585	11.347	23756.9	21061.4	11.346
532.05	0.998	13.833	14.59	-5.473	44.652	39.585	11.346	23801.5	21101	11.346
533.05	0.998	13.833	14.59	-5.474	44.652	39.586	11.345	23846.2	21140.8	11.345
534.05	0.998	13.833	14.59	-5.474	44.652	39.586	11.345	23890.8	21180.7	11.344
535.05	0.998	13.833	14.59	-5.474	44.652	39.586	11.344	23935.5	21220.1	11.345
536.05	0.998	13.833	14.59	-5.475	44.652	39.587	11.344	23980.1	21259.6	11.345
537.05	0.998	13.833	14.59	-5.475	44.652	39.587	11.343	24024.8	21299.3	11.344
538.05	0.998	13.833	14.59	-5.475	44.652	39.587	11.342	24069.4	21339.2	11.343
539.05	0.998	13.833	14.59	-5.476	44.652	39.587	11.342	24114.1	21379.2	11.342
540.05	0.998	13.833	14.59	-5.475	44.707	39.588	11.452	24188.9	21418.6	11.453
541.05	0.998	13.833	14.591	-5.476	44.707	39.588	11.451	24233.6	21458.9	11.45
542.05	0.998	13.833	14.591	-5.476	44.707	39.588	11.451	24278.3	21498.6	11.449
543.05	0.998	13.833	14.591	-5.476	44.707	39.588	11.45	24323	21537.8	11.451
544.05	0.998	13.833	14.591	-5.477	44.707	39.589	11.449	24367.8	21577.8	11.449
545.05	0.998	13.833	14.591	-5.477	44.707	39.589	11.449	24412.5	21617.3	11.45
546.05	0.998	13.833	14.591	-5.477	44.707	39.589	11.448	24457.2	21656.9	11.45
547.05	0.998	13.833	14.591	-5.478	44.707	39.59	11.448	24501.9	21696.7	11.449
548.05	0.998	13.833	14.591	-5.478	44.707	39.59	11.447	24546.6	21736.6	11.448
549.05	0.998	13.833	14.591	-5.478	44.707	39.59	11.446	24591.3	21776.7	11.446
550.05	0.998	13.833	14.591	-5.479	44.707	39.59	11.446	24636	21816.1	11.446
551.05	0.998	13.833	14.591	-5.479	44.707	39.591	11.445	24680.7	21855.8	11.446
552.05	0.998	13.833	14.591	-5.48	44.707	39.591	11.445	24725.4	21895.5	11.445
553.05	0.998	13.833	14.591	-5.48	44.707	39.591	11.444	24770.1	21935.4	11.444
554.05	0.998	13.833	14.591	-5.48	44.707	39.591	11.444	24814.8	21975.5	11.442
555.05	0.998	13.833	14.591	-5.481	44.707	39.592	11.443	24859.5	22015	11.443
556.05	0.998	13.833	14.591	-5.481	44.707	39.592	11.442	24904.2	22054.6	11.442
557.05	0.998	13.833	14.591	-5.481	44.707	39.592	11.442	24949	22094.3	11.442
558.05	0.998	13.833	14.591	-5.482	44.707	39.592	11.441	24993.7	22134.2	11.441
559.05	0.998	13.833	14.591	-5.482	44.707	39.593	11.441	25038.4	22173.5	11.442

560.05	0.998	13.833	14.591	-5.482	44.707	39.593	11.44	25083.1	22213.7	11.439
561.05	0.998	13.833	14.591	-5.483	44.707	39.593	11.44	25127.8	22253.3	11.439
562.05	0.998	13.833	14.592	-5.483	44.707	39.593	11.439	25172.5	22293	11.439
563.05	0.998	13.833	14.592	-5.483	44.707	39.594	11.438	25217.2	22332.9	11.438
564.05	0.998	13.833	14.592	-5.484	44.707	39.594	11.438	25261.9	22372.2	11.439
565.05	0.998	13.833	14.592	-5.484	44.707	39.594	11.437	25306.6	22412.3	11.437
566.05	0.998	13.833	14.592	-5.484	44.707	39.594	11.437	25351.3	22451.8	11.437
567.05	0.998	13.833	14.592	-5.485	44.707	39.595	11.436	25396	22491.5	11.437
568.05	0.998	13.833	14.592	-5.485	44.707	39.595	11.436	25440.7	22531.3	11.436
569.05	0.998	13.833	14.592	-5.485	44.707	39.595	11.435	25485.4	22571.3	11.435
570.05	0.998	13.833	14.592	-5.486	44.707	39.595	11.435	25530.1	22610.6	11.436
571.05	0.998	13.833	14.592	-5.485	44.765	39.596	11.547	25607.6	22650.8	11.546
572.05	0.998	13.833	14.592	-5.485	44.765	39.596	11.547	25652.3	22690.4	11.546
573.05	0.998	13.833	14.592	-5.486	44.765	39.596	11.546	25697.1	22730.1	11.546
574.05	0.998	13.833	14.592	-5.486	44.765	39.596	11.546	25741.9	22770	11.545
575.05	0.998	13.833	14.592	-5.486	44.765	39.597	11.545	25786.6	22809.2	11.546
576.05	0.998	13.833	14.592	-5.487	44.765	39.597	11.544	25831.4	22849.4	11.544
577.05	0.998	13.833	14.592	-5.487	44.765	39.597	11.544	25876.1	22888.9	11.545
578.05	0.998	13.833	14.592	-5.487	44.765	39.597	11.543	25920.9	22928.5	11.544
579.05	0.998	13.833	14.592	-5.488	44.765	39.597	11.543	25965.7	22968.3	11.544
580.05	0.998	13.833	14.592	-5.488	44.765	39.598	11.542	26010.4	23008.2	11.542
581.05	0.998	13.833	14.592	-5.488	44.765	39.598	11.542	26055.2	23048.2	11.541
582.05	0.998	13.833	14.592	-5.489	44.765	39.598	11.541	26100	23087.6	11.542
583.05	0.998	13.833	14.592	-5.489	44.765	39.598	11.541	26144.7	23127.2	11.542
584.05	0.998	13.833	14.592	-5.489	44.765	39.599	11.54	26189.5	23166.8	11.542
585.05	0.998	13.833	14.593	-5.49	44.765	39.599	11.54	26234.3	23206.6	11.541
586.05	0.998	13.833	14.593	-5.49	44.765	39.599	11.539	26279	23246.5	11.54
587.05	0.998	13.833	14.593	-5.49	44.765	39.599	11.539	26323.8	23286.6	11.538
588.05	0.998	13.833	14.593	-5.49	44.765	39.6	11.538	26368.6	23326	11.539
589.05	0.998	13.833	14.593	-5.491	44.765	39.6	11.538	26413.3	23365.5	11.539
590.05	0.998	13.833	14.593	-5.491	44.765	39.6	11.537	26458.1	23405.9	11.536
591.05	0.998	13.833	14.593	-5.491	44.765	39.6	11.537	26502.8	23445.7	11.535
592.05	0.998	13.833	14.593	-5.492	44.765	39.6	11.536	26547.6	23484.8	11.537
593.05	0.998	13.833	14.593	-5.492	44.765	39.601	11.536	26592.4	23524.9	11.535
594.05	0.998	13.833	14.593	-5.492	44.765	39.601	11.535	26637.1	23564.2	11.536
595.05	0.998	13.833	14.593	-5.493	44.765	39.601	11.535	26681.9	23604.5	11.534
596.05	0.998	13.833	14.593	-5.493	44.765	39.601	11.534	26726.7	23644.1	11.534
597.05	0.998	13.833	14.593	-5.493	44.765	39.602	11.534	26771.4	23683.9	11.533
598.05	0.998	13.833	14.593	-5.493	44.765	39.602	11.533	26816.2	23723.8	11.532
599.05	0.998	13.833	14.593	-5.494	44.765	39.602	11.533	26861	23762.9	11.534
600.05	0.998	13.833	14.593	-5.494	44.765	39.602	11.532	26905.7	23803.1	11.532
601.05	0.998	13.833	14.593	-5.494	44.765	39.602	11.532	26950.5	23842.5	11.532
602.05	0.998	13.833	14.593	-5.495	44.765	39.603	11.531	26995.3	23882	11.533

603.05	0.998	13.833	14.593	-5.495	44.765	39.603	11.531	27040	23921.7	11.532
604.05	0.998	13.833	14.593	-5.495	44.765	39.603	11.53	27084.8	23961.5	11.531
605.05	0.998	13.833	14.593	-5.495	44.765	39.603	11.53	27129.6	24001.5	11.53
606.05	0.998	13.833	14.593	-5.495	44.823	39.604	11.645	27209.9	24041.6	11.644
607.05	0.998	13.833	14.593	-5.495	44.823	39.604	11.645	27254.7	24080.9	11.645
608.05	0.998	13.833	14.593	-5.496	44.823	39.604	11.644	27299.5	24120.4	11.646
609.05	0.998	13.833	14.594	-5.496	44.823	39.604	11.644	27344.4	24160.9	11.642
610.05	0.998	13.833	14.594	-5.496	44.823	39.604	11.643	27389.2	24200.6	11.642
611.05	0.998	13.833	14.594	-5.496	44.823	39.605	11.643	27434	24239.6	11.644
612.05	0.998	13.833	14.594	-5.497	44.823	39.605	11.642	27478.8	24279.5	11.643
613.05	0.998	13.833	14.594	-5.497	44.823	39.605	11.642	27523.7	24319.7	11.641
614.05	0.998	13.833	14.594	-5.497	44.823	39.605	11.641	27568.5	24359	11.642
615.05	0.998	13.833	14.594	-5.498	44.823	39.605	11.641	27613.3	24398.5	11.642
616.05	0.998	13.833	14.594	-5.498	44.823	39.606	11.64	27658.1	24439	11.639
617.05	0.998	13.833	14.594	-5.498	44.823	39.606	11.64	27703	24478.8	11.639
618.05	0.998	13.833	14.594	-5.498	44.823	39.606	11.639	27747.8	24517.7	11.641
619.05	0.998	13.833	14.594	-5.499	44.823	39.606	11.639	27792.6	24557.7	11.639
620.05	0.998	13.833	14.594	-5.499	44.823	39.607	11.638	27837.4	24597.8	11.638
621.05	0.998	13.833	14.594	-5.499	44.823	39.607	11.638	27882.2	24637.2	11.638
622.05	0.998	13.833	14.594	-5.499	44.823	39.607	11.638	27927.1	24676.7	11.639
623.05	0.998	13.833	14.594	-5.5	44.823	39.607	11.637	27971.9	24717.2	11.636
624.05	0.998	13.833	14.594	-5.5	44.823	39.607	11.637	28016.7	24756.9	11.635
625.05	0.998	13.833	14.594	-5.5	44.823	39.608	11.636	28061.5	24795.8	11.638
626.05	0.998	13.833	14.594	-5.501	44.823	39.608	11.636	28106.4	24835.8	11.636
627.05	0.998	13.833	14.594	-5.501	44.823	39.608	11.635	28151.2	24875.9	11.635
628.05	0.998	13.833	14.594	-5.501	44.823	39.608	11.635	28196	24915.2	11.636
629.05	0.998	13.833	14.594	-5.501	44.823	39.608	11.634	28240.8	24955.6	11.633
630.05	0.998	13.833	14.594	-5.502	44.823	39.609	11.634	28285.7	24995.1	11.633
631.05	0.998	13.833	14.594	-5.502	44.823	39.609	11.633	28330.5	25034.8	11.633
632.05	0.998	13.833	14.594	-5.502	44.823	39.609	11.633	28375.3	25074.6	11.632
633.05	0.998	13.833	14.594	-5.502	44.823	39.609	11.633	28420.1	25114.5	11.631
634.05	0.998	13.833	14.594	-5.503	44.823	39.609	11.632	28465	25153.6	11.633
635.05	0.998	13.833	14.594	-5.503	44.823	39.61	11.632	28509.8	25193.8	11.631
636.05	0.998	13.833	14.595	-5.503	44.823	39.61	11.631	28554.6	25233.1	11.632
637.05	0.998	13.833	14.595	-5.503	44.823	39.61	11.631	28599.4	25272.6	11.632
638.05	0.998	13.833	14.595	-5.504	44.823	39.61	11.63	28644.2	25313.2	11.629
639.05	0.998	13.833	14.595	-5.504	44.823	39.61	11.63	28689.1	25352.9	11.629
640.05	0.998	13.833	14.595	-5.504	44.823	39.61	11.63	28733.9	25392.7	11.628
641.05	0.998	13.833	14.595	-5.505	44.823	39.611	11.629	28778.7	25431.7	11.63
642.05	0.998	13.833	14.595	-5.505	44.823	39.611	11.629	28823.5	25471.8	11.628
643.05	0.998	13.833	14.595	-5.505	44.823	39.611	11.628	28868.4	25511	11.63
644.05	0.998	13.833	14.595	-5.505	44.823	39.611	11.628	28913.2	25551.4	11.627
645.05	0.998	13.833	14.595	-5.505	44.883	39.611	11.746	28996.9	25590.9	11.746

646.05	0.998	13.833	14.595	-5.505	44.883	39.612	11.746	29041.8	25630.5	11.746
647.05	0.998	13.833	14.595	-5.505	44.883	39.612	11.745	29086.7	25670.2	11.746
648.05	0.998	13.833	14.595	-5.506	44.883	39.612	11.745	29131.5	25710	11.745
649.05	0.998	13.833	14.595	-5.506	44.883	39.612	11.744	29176.4	25750	11.744
650.05	0.998	13.833	14.595	-5.506	44.883	39.612	11.744	29221.3	25790.1	11.742
651.05	0.998	13.833	14.595	-5.506	44.883	39.613	11.743	29266.2	25829.3	11.744
652.05	0.998	13.833	14.595	-5.507	44.883	39.613	11.743	29311.1	25868.6	11.745
653.05	0.998	13.833	14.595	-5.507	44.883	39.613	11.743	29356	25909.1	11.742
654.05	0.998	13.833	14.595	-5.507	44.883	39.613	11.742	29400.8	25948.7	11.742
655.05	0.998	13.833	14.595	-5.507	44.883	39.613	11.742	29445.7	25988.4	11.742
656.05	0.998	13.833	14.595	-5.508	44.883	39.614	11.741	29490.6	26028.2	11.741
657.05	0.998	13.833	14.595	-5.508	44.883	39.614	11.741	29535.5	26068.1	11.74
658.05	0.998	13.833	14.595	-5.508	44.883	39.614	11.741	29580.4	26107.1	11.742
659.05	0.998	13.833	14.595	-5.508	44.883	39.614	11.74	29625.3	26147.3	11.74
660.05	0.998	13.833	14.595	-5.509	44.883	39.614	11.74	29670.1	26186.6	11.741
661.05	0.998	13.833	14.595	-5.509	44.883	39.614	11.739	29715	26227	11.738
662.05	0.998	13.833	14.595	-5.509	44.883	39.615	11.739	29759.9	26266.5	11.739
663.05	0.998	13.833	14.595	-5.509	44.883	39.615	11.739	29804.8	26306.2	11.739
664.05	0.998	13.833	14.595	-5.509	44.883	39.615	11.738	29849.7	26345.9	11.738
665.05	0.998	13.833	14.596	-5.51	44.883	39.615	11.738	29894.6	26385.8	11.737
666.05	0.999	13.833	14.596	-5.51	44.883	39.615	11.737	29939.4	26425.7	11.736
667.05	0.999	13.833	14.596	-5.51	44.883	39.615	11.737	29984.3	26464.8	11.738
668.05	0.999	13.833	14.596	-5.51	44.883	39.616	11.737	30029.2	26505	11.736
669.05	0.999	13.833	14.596	-5.511	44.883	39.616	11.736	30074.1	26544.3	11.737
670.05	0.999	13.833	14.596	-5.511	44.883	39.616	11.736	30119	26584.8	11.734
671.05	0.999	13.833	14.596	-5.511	44.883	39.616	11.735	30163.9	26624.3	11.735
672.05	0.999	13.833	14.596	-5.511	44.883	39.616	11.735	30208.7	26663.9	11.734
673.05	0.999	13.833	14.596	-5.512	44.883	39.617	11.735	30253.6	26703.7	11.734
674.05	0.999	13.833	14.596	-5.512	44.883	39.617	11.734	30298.5	26743.6	11.733
675.05	0.999	13.833	14.596	-5.512	44.883	39.617	11.734	30343.4	26782.5	11.735
676.05	0.999	13.833	14.596	-5.512	44.883	39.617	11.733	30388.3	26822.6	11.734
677.05	0.999	13.833	14.596	-5.513	44.883	39.617	11.733	30433.2	26862.8	11.732
678.05	0.999	13.833	14.596	-5.513	44.883	39.617	11.733	30478	26902.1	11.733
679.05	0.999	13.833	14.596	-5.513	44.883	39.618	11.732	30522.9	26941.4	11.734
680.05	0.999	13.833	14.596	-5.513	44.883	39.618	11.732	30567.8	26982	11.731
681.05	0.999	13.833	14.596	-5.513	44.883	39.618	11.731	30612.7	27021.6	11.731
682.05	0.999	13.833	14.596	-5.514	44.883	39.618	11.731	30657.6	27061.3	11.73
683.05	0.999	13.833	14.596	-5.514	44.883	39.618	11.731	30702.5	27101.2	11.73
684.05	0.999	13.833	14.596	-5.514	44.883	39.618	11.73	30747.3	27141.1	11.729
685.05	0.999	13.833	14.596	-5.514	44.883	39.619	11.73	30792.2	27180.1	11.731
686.05	0.999	13.833	14.596	-5.515	44.883	39.619	11.73	30837.1	27220.3	11.729
687.05	0.999	13.833	14.596	-5.515	44.883	39.619	11.729	30882	27259.5	11.73
688.05	0.999	13.833	14.596	-5.515	44.883	39.619	11.729	30926.9	27299.9	11.728

689.05	0.999	13.833	14.596	-5.515	44.945	39.619	11.85	31014.5	27339.3	11.85
690.05	0.999	13.833	14.596	-5.515	44.945	39.619	11.85	31059.4	27378.8	11.85
691.05	0.999	13.833	14.596	-5.515	44.945	39.62	11.849	31104.4	27418.5	11.85
692.05	0.999	13.833	14.596	-5.515	44.945	39.62	11.849	31149.3	27458.2	11.85
693.05	0.999	13.833	14.596	-5.515	44.945	39.62	11.849	31194.2	27498.1	11.849
694.05	0.999	13.833	14.596	-5.516	44.945	39.62	11.848	31239.2	27538.1	11.848
695.05	0.999	13.833	14.596	-5.516	44.945	39.62	11.848	31284.1	27578.2	11.846
696.05	0.999	13.833	14.596	-5.516	44.945	39.62	11.847	31329.1	27617.3	11.848
697.05	0.999	13.833	14.597	-5.516	44.945	39.621	11.847	31374	27657.6	11.846
698.05	0.999	13.833	14.597	-5.517	44.945	39.621	11.847	31419	27696.9	11.847
699.05	0.999	13.833	14.597	-5.517	44.945	39.621	11.846	31463.9	27736.3	11.847
700.05	0.999	13.833	14.597	-5.517	44.945	39.621	11.846	31508.9	27775.8	11.848
701.05	0.999	13.833	14.597	-5.517	44.945	39.621	11.846	31553.8	27816.6	11.844
702.05	0.999	13.833	14.597	-5.517	44.945	39.621	11.845	31598.8	27856.3	11.844
703.05	0.999	13.833	14.597	-5.518	44.945	39.622	11.845	31643.7	27895	11.847
704.05	0.999	13.833	14.597	-5.518	44.945	39.622	11.845	31688.6	27935	11.845
705.05	0.999	13.833	14.597	-5.518	44.945	39.622	11.844	31733.6	27975.1	11.844
706.05	0.999	13.833	14.597	-5.518	44.945	39.622	11.844	31778.5	28015.3	11.842
707.05	0.999	13.833	14.597	-5.518	44.945	39.622	11.844	31823.5	28054.4	11.844
708.05	0.999	13.833	14.597	-5.519	44.945	39.622	11.843	31868.4	28093.7	11.845
709.05	0.999	13.833	14.597	-5.519	44.945	39.623	11.843	31913.4	28134.2	11.842
710.05	0.999	13.833	14.597	-5.519	44.945	39.623	11.842	31958.3	28173.7	11.843
711.05	0.999	13.833	14.597	-5.519	44.945	39.623	11.842	32003.3	28213.2	11.843
712.05	0.999	13.833	14.597	-5.52	44.945	39.623	11.842	32048.2	28252.9	11.843
713.05	0.999	13.833	14.597	-5.52	44.945	39.623	11.841	32093.1	28292.7	11.842
714.05	0.999	13.833	14.597	-5.52	44.945	39.623	11.841	32138.1	28332.6	11.841
715.05	0.999	13.833	14.597	-5.52	44.945	39.623	11.841	32183	28372.6	11.84
716.05	0.999	13.833	14.597	-5.52	44.945	39.624	11.84	32228	28411.5	11.842
717.05	0.999	13.833	14.597	-5.521	44.945	39.624	11.84	32272.9	28451.8	11.84
718.05	0.999	13.833	14.597	-5.521	44.945	39.624	11.84	32317.9	28492.1	11.838
719.05	0.999	13.833	14.597	-5.521	44.945	39.624	11.839	32362.8	28531.4	11.839
720.05	0.999	13.833	14.597	-5.521	44.945	39.624	11.839	32407.8	28570.7	11.84
721.05	0.999	13.833	14.597	-5.521	44.945	39.624	11.839	32452.7	28610.2	11.84
722.05	0.999	13.833	14.597	-5.522	44.945	39.625	11.838	32497.7	28651	11.837
723.05	0.999	13.833	14.597	-5.522	44.945	39.625	11.838	32542.6	28690.6	11.837
724.05	0.999	13.833	14.597	-5.522	44.945	39.625	11.838	32587.5	28730.4	11.836
725.05	0.999	13.833	14.597	-5.522	44.945	39.625	11.837	32632.5	28769.1	11.839
726.05	0.999	13.833	14.597	-5.522	44.945	39.625	11.837	32677.4	28809.1	11.838
727.05	0.999	13.833	14.597	-5.523	44.945	39.625	11.837	32722.4	28849.2	11.837
728.05	0.999	13.833	14.597	-5.523	44.945	39.625	11.836	32767.3	28889.4	11.835
729.05	0.999	13.833	14.597	-5.523	44.945	39.626	11.836	32812.3	28928.5	11.836
730.05	0.999	13.833	14.597	-5.523	44.945	39.626	11.836	32857.2	28969	11.834
731.05	0.999	13.833	14.598	-5.523	44.945	39.626	11.835	32902.2	29008.2	11.835

732.05	0.999	13.833	14.598	-5.524	44.945	39.626	11.835	32947.1	29047.6	11.836
733.05	0.999	13.833	14.598	-5.524	44.945	39.626	11.835	32992.1	29087.2	11.836
734.05	0.999	13.833	14.598	-5.524	44.945	39.626	11.834	33037	29126.8	11.836
735.05	0.999	13.833	14.598	-5.524	44.945	39.626	11.834	33081.9	29166.5	11.836
736.05	0.999	13.833	14.598	-5.524	44.945	39.627	11.834	33126.9	29206.3	11.835
737.05	0.999	13.833	14.598	-5.525	44.945	39.627	11.833	33171.8	29246.2	11.834
738.05	0.999	13.833	14.598	-5.525	44.945	39.627	11.833	33216.8	29286.3	11.833
739.05	0.999	13.833	14.598	-5.525	44.945	39.627	11.833	33261.7	29326.5	11.831
740.05	0.999	13.834	14.598	-5.524	45.009	39.627	11.957	33353.9	29365.4	11.958
741.05	0.999	13.834	14.598	-5.525	45.009	39.627	11.957	33398.9	29405.8	11.956
742.05	0.999	13.834	14.598	-5.525	45.009	39.627	11.957	33443.9	29445	11.957
743.05	0.999	13.834	14.598	-5.525	45.009	39.628	11.956	33488.9	29484.2	11.958
744.05	0.999	13.834	14.598	-5.525	45.009	39.628	11.956	33533.9	29524.9	11.955
745.05	0.999	13.834	14.598	-5.525	45.009	39.628	11.956	33578.9	29564.4	11.955
746.05	0.999	13.834	14.598	-5.526	45.009	39.628	11.955	33624	29604	11.956
747.05	0.999	13.834	14.598	-5.526	45.009	39.628	11.955	33669	29643.7	11.955
748.05	0.999	13.834	14.598	-5.526	45.009	39.628	11.955	33714	29683.6	11.955
749.05	0.999	13.834	14.598	-5.526	45.009	39.628	11.954	33759	29723.5	11.954
750.05	0.999	13.834	14.598	-5.526	45.009	39.629	11.954	33804	29763.5	11.953
751.05	0.999	13.834	14.598	-5.527	45.009	39.629	11.954	33849	29802.3	11.955
752.05	0.999	13.834	14.598	-5.527	45.009	39.629	11.954	33894	29842.5	11.953
753.05	0.999	13.834	14.598	-5.527	45.009	39.629	11.953	33939	29882.9	11.951
754.05	0.999	13.834	14.598	-5.527	45.009	39.629	11.953	33984	29922	11.953
755.05	0.999	13.834	14.598	-5.527	45.009	39.629	11.953	34029	29961.2	11.954
756.05	0.999	13.834	14.598	-5.527	45.009	39.629	11.952	34074	30001.9	11.951
757.05	0.999	13.834	14.598	-5.528	45.009	39.63	11.952	34119.1	30041.3	11.952
758.05	0.999	13.834	14.598	-5.528	45.009	39.63	11.952	34164.1	30080.8	11.952
759.05	0.999	13.834	14.598	-5.528	45.009	39.63	11.951	34209.1	30120.4	11.952
760.05	0.999	13.834	14.598	-5.528	45.009	39.63	11.951	34254.1	30160.1	11.952
761.05	0.999	13.834	14.598	-5.528	45.009	39.63	11.951	34299.1	30200	11.951
762.05	0.999	13.834	14.598	-5.529	45.009	39.63	11.95	34344.1	30239.9	11.95
763.05	0.999	13.834	14.598	-5.529	45.009	39.63	11.95	34389.1	30279.9	11.949
764.05	0.999	13.834	14.598	-5.529	45.009	39.631	11.95	34434.1	30318.7	11.952
765.05	0.999	13.834	14.598	-5.529	45.009	39.631	11.95	34479.1	30359	11.95
766.05	0.999	13.834	14.598	-5.529	45.009	39.631	11.949	34524.1	30399.3	11.948
767.05	0.999	13.834	14.598	-5.529	45.009	39.631	11.949	34569.1	30438.4	11.949
768.05	0.999	13.834	14.598	-5.53	45.009	39.631	11.949	34614.2	30477.6	11.951
769.05	0.999	13.834	14.598	-5.53	45.009	39.631	11.948	34659.2	30518.2	11.948
770.05	0.999	13.834	14.599	-5.53	45.009	39.631	11.948	34704.2	30557.6	11.948
771.05	0.999	13.834	14.599	-5.53	45.009	39.631	11.948	34749.2	30597.1	11.949
772.05	0.999	13.834	14.599	-5.53	45.009	39.632	11.947	34794.2	30636.7	11.949
773.05	0.999	13.834	14.599	-5.531	45.009	39.632	11.947	34839.2	30676.3	11.949
774.05	0.999	13.834	14.599	-5.531	45.009	39.632	11.947	34884.2	30716.1	11.948

775.05	0.999	13.834	14.599	-5.531	45.009	39.632	11.947	34929.2	30756	11.948
776.05	0.999	13.834	14.599	-5.531	45.009	39.632	11.946	34974.2	30796	11.947
777.05	0.999	13.834	14.599	-5.531	45.009	39.632	11.946	35019.2	30836.1	11.945
778.05	0.999	13.834	14.599	-5.531	45.009	39.632	11.946	35064.2	30876.3	11.944
779.05	0.999	13.834	14.599	-5.532	45.009	39.633	11.945	35109.3	30915.1	11.946
780.05	0.999	13.834	14.599	-5.532	45.009	39.633	11.945	35154.3	30955.5	11.944
781.05	0.999	13.834	14.599	-5.532	45.009	39.633	11.945	35199.3	30994.6	11.945
782.05	0.999	13.834	14.599	-5.532	45.009	39.633	11.945	35244.3	31035.2	11.943
783.05	0.999	13.834	14.599	-5.532	45.009	39.633	11.944	35289.3	31074.5	11.944
784.05	0.999	13.834	14.599	-5.532	45.009	39.633	11.944	35334.3	31113.8	11.944
785.05	0.999	13.834	14.599	-5.533	45.009	39.633	11.944	35379.3	31153.3	11.945
786.05	0.999	13.834	14.599	-5.533	45.009	39.633	11.943	35424.3	31192.8	11.945
787.05	0.999	13.834	14.599	-5.533	45.009	39.634	11.943	35469.3	31232.5	11.945
788.05	0.999	13.834	14.599	-5.533	45.009	39.634	11.943	35514.3	31272.3	11.945
789.05	0.999	13.834	14.599	-5.533	45.009	39.634	11.943	35559.3	31312.1	11.944
790.05	0.999	13.834	14.599	-5.533	45.009	39.634	11.942	35604.4	31352.1	11.943
791.05	0.999	13.834	14.599	-5.534	45.009	39.634	11.942	35649.4	31392.2	11.942
792.05	0.999	13.834	14.599	-5.534	45.009	39.634	11.942	35694.4	31432.3	11.94
793.05	0.999	13.834	14.599	-5.534	45.009	39.634	11.941	35739.4	31471.1	11.943
794.05	0.999	13.834	14.599	-5.534	45.009	39.634	11.941	35784.4	31511.5	11.941
795.05	0.999	13.834	14.599	-5.534	45.009	39.635	11.941	35829.4	31550.4	11.943
796.05	0.999	13.834	14.599	-5.534	45.009	39.635	11.941	35874.4	31591	11.94
797.05	0.999	13.834	14.599	-5.535	45.009	39.635	11.94	35919.4	31630.2	11.941
798.05	0.999	13.834	14.599	-5.535	45.009	39.635	11.94	35964.4	31671	11.938
799.05	0.999	13.834	14.599	-5.534	45.075	39.635	12.068	36062.1	31710.3	12.067
800.05	0.999	13.834	14.599	-5.535	45.075	39.635	12.068	36107.1	31749.8	12.068
801.05	0.999	13.834	14.599	-5.535	45.075	39.635	12.068	36152.2	31789.4	12.068
802.05	0.999	13.834	14.599	-5.535	45.075	39.635	12.067	36197.3	31829	12.068
803.05	0.999	13.834	14.599	-5.535	45.075	39.636	12.067	36242.4	31868.8	12.068
804.05	0.999	13.834	14.599	-5.535	45.075	39.636	12.067	36287.4	31908.6	12.067
805.05	0.999	13.834	14.599	-5.535	45.075	39.636	12.067	36332.5	31948.6	12.066
806.05	0.999	13.834	14.599	-5.535	45.075	39.636	12.066	36377.6	31988.6	12.065
807.05	0.999	13.834	14.599	-5.536	45.075	39.636	12.066	36422.7	32027.3	12.068
808.05	0.999	13.834	14.599	-5.536	45.075	39.636	12.066	36467.7	32067.5	12.066
809.05	0.999	13.834	14.599	-5.536	45.075	39.636	12.066	36512.8	32107.9	12.064
810.05	0.999	13.834	14.599	-5.536	45.075	39.636	12.065	36557.9	32146.8	12.066
811.05	0.999	13.834	14.599	-5.536	45.075	39.637	12.065	36603	32187.3	12.064
812.05	0.999	13.834	14.599	-5.536	45.075	39.637	12.065	36648	32226.4	12.065
813.05	0.999	13.834	14.6	-5.537	45.075	39.637	12.065	36693.1	32265.6	12.066
814.05	0.999	13.834	14.6	-5.537	45.075	39.637	12.064	36738.2	32306.5	12.063
815.05	0.999	13.834	14.6	-5.537	45.075	39.637	12.064	36783.3	32345.8	12.064
816.05	0.999	13.834	14.6	-5.537	45.075	39.637	12.064	36828.3	32385.3	12.064
817.05	0.999	13.834	14.6	-5.537	45.075	39.637	12.063	36873.4	32424.9	12.064

818.05	0.999	13.834	14.6	-5.537	45.075	39.637	12.063	36918.5	32464.6	12.064
819.05	0.999	13.834	14.6	-5.538	45.075	39.637	12.063	36963.6	32504.3	12.064
820.05	0.999	13.834	14.6	-5.538	45.075	39.638	12.063	37008.6	32544.2	12.063
821.05	0.999	13.834	14.6	-5.538	45.075	39.638	12.062	37053.7	32584.2	12.062
822.05	0.999	13.834	14.6	-5.538	45.075	39.638	12.062	37098.8	32624.2	12.061
823.05	0.999	13.834	14.6	-5.538	45.075	39.638	12.062	37143.9	32664.4	12.06
824.05	0.999	13.834	14.6	-5.538	45.075	39.638	12.062	37188.9	32703	12.063
825.05	0.999	13.834	14.6	-5.538	45.075	39.638	12.061	37234	32743.4	12.061
826.05	0.999	13.834	14.6	-5.539	45.075	39.638	12.061	37279.1	32782.2	12.063
827.05	0.999	13.834	14.6	-5.539	45.075	39.638	12.061	37324.2	32822.8	12.06
828.05	0.999	13.834	14.6	-5.539	45.075	39.639	12.061	37369.2	32861.8	12.062
829.05	0.999	13.834	14.6	-5.539	45.075	39.639	12.06	37414.3	32902.5	12.059
830.05	0.999	13.834	14.6	-5.539	45.075	39.639	12.06	37459.4	32941.7	12.06
831.05	0.999	13.834	14.6	-5.539	45.075	39.639	12.06	37504.5	32981	12.061
832.05	0.999	13.834	14.6	-5.54	45.075	39.639	12.06	37549.5	33020.4	12.062
833.05	0.999	13.834	14.6	-5.54	45.075	39.639	12.059	37594.6	33061.6	12.058
834.05	0.999	13.834	14.6	-5.54	45.075	39.639	12.059	37639.7	33101.1	12.058
835.05	0.999	13.834	14.6	-5.54	45.075	39.639	12.059	37684.8	33140.8	12.058
836.05	0.999	13.834	14.6	-5.54	45.075	39.639	12.059	37729.8	33180.6	12.057
837.05	0.999	13.834	14.6	-5.54	45.075	39.64	12.058	37774.9	33220.5	12.057
838.05	0.999	13.834	14.6	-5.54	45.075	39.64	12.058	37820	33260.5	12.056
839.05	0.999	13.834	14.6	-5.541	45.075	39.64	12.058	37865.1	33298.9	12.059
840.05	0.999	13.834	14.6	-5.541	45.075	39.64	12.058	37910.1	33339	12.058
841.05	0.999	13.834	14.6	-5.541	45.075	39.64	12.057	37955.2	33379.3	12.056
842.05	0.999	13.834	14.6	-5.541	45.075	39.64	12.057	38000.3	33417.9	12.059
843.05	0.999	13.834	14.6	-5.541	45.075	39.64	12.057	38045.3	33458.4	12.057
844.05	0.999	13.834	14.6	-5.541	45.075	39.64	12.057	38090.4	33497.2	12.059
845.05	0.999	13.834	14.6	-5.542	45.075	39.64	12.056	38135.5	33537.9	12.056
846.05	0.999	13.834	14.6	-5.542	45.075	39.641	12.056	38180.6	33576.9	12.058
847.05	0.999	13.834	14.6	-5.542	45.075	39.641	12.056	38225.6	33617.7	12.055
848.05	0.999	13.834	14.6	-5.542	45.075	39.641	12.056	38270.7	33657	12.056
849.05	0.999	13.834	14.6	-5.542	45.075	39.641	12.055	38315.8	33696.3	12.057
850.05	0.999	13.834	14.6	-5.542	45.075	39.641	12.055	38360.9	33735.7	12.057
851.05	0.999	13.834	14.6	-5.542	45.075	39.641	12.055	38405.9	33776.9	12.053
852.05	0.999	13.834	14.6	-5.543	45.075	39.641	12.055	38451	33816.5	12.053
853.05	0.999	13.834	14.6	-5.543	45.075	39.641	12.054	38496.1	33856.2	12.053
854.05	0.999	13.834	14.6	-5.543	45.075	39.641	12.054	38541.2	33896	12.053
855.05	0.999	13.834	14.6	-5.543	45.075	39.642	12.054	38586.2	33935.8	12.052
856.05	0.999	13.834	14.6	-5.543	45.075	39.642	12.054	38631.3	33974.1	12.056
857.05	0.999	13.834	14.6	-5.543	45.075	39.642	12.053	38676.4	34014.1	12.055
858.05	0.999	13.834	14.6	-5.543	45.075	39.642	12.053	38721.5	34054.3	12.053
859.05	0.999	13.834	14.6	-5.544	45.075	39.642	12.053	38766.5	34094.5	12.052
860.05	0.999	13.834	14.6	-5.544	45.075	39.642	12.053	38811.6	34133.1	12.055

861.05	0.999	13.834	14.601	-5.544	45.075	39.642	12.052	38856.7	34173.5	12.052
862.05	0.999	13.834	14.601	-5.544	45.075	39.642	12.052	38901.8	34214.1	12.05
863.05	0.999	13.834	14.601	-5.544	45.075	39.642	12.052	38946.8	34252.9	12.052
864.05	0.999	13.834	14.601	-5.544	45.075	39.643	12.052	38991.9	34291.9	12.054
865.05	0.999	13.834	14.601	-5.544	45.075	39.643	12.052	39037	34332.7	12.051
866.05	0.999	13.834	14.601	-5.545	45.075	39.643	12.051	39082.1	34371.8	12.052
867.05	0.999	13.834	14.601	-5.545	45.075	39.643	12.051	39127.1	34412.8	12.049
868.05	0.999	13.834	14.601	-5.545	45.075	39.643	12.051	39172.2	34452.1	12.05
869.05	0.999	13.834	14.601	-5.544	45.143	39.643	12.183	39276.5	34491.5	12.183
870.05	0.999	13.834	14.601	-5.545	45.143	39.643	12.183	39321.6	34531	12.183
871.05	0.999	13.834	14.601	-5.545	45.143	39.643	12.183	39366.8	34570.5	12.183
872.05	0.999	13.834	14.601	-5.545	45.143	39.643	12.182	39411.9	34610.2	12.183
873.05	0.999	13.834	14.601	-5.545	45.143	39.643	12.182	39457	34650	12.183
874.05	0.999	13.834	14.601	-5.545	45.143	39.644	12.182	39502.2	34689.8	12.183
875.05	0.999	13.834	14.601	-5.545	45.143	39.644	12.182	39547.3	34729.8	12.182
876.05	0.999	13.834	14.601	-5.545	45.143	39.644	12.181	39592.5	34769.8	12.181
877.05	0.999	13.834	14.601	-5.545	45.143	39.644	12.181	39637.6	34809.9	12.18
878.05	0.999	13.834	14.601	-5.546	45.143	39.644	12.181	39682.8	34848.3	12.183
879.05	0.999	13.834	14.601	-5.546	45.143	39.644	12.181	39727.9	34888.6	12.181
880.05	0.999	13.834	14.601	-5.546	45.143	39.644	12.181	39773	34929	12.179
881.05	0.999	13.834	14.601	-5.546	45.143	39.644	12.18	39818.2	34967.7	12.182
882.05	0.999	13.834	14.601	-5.546	45.143	39.644	12.18	39863.3	35008.3	12.179
883.05	0.999	13.834	14.601	-5.546	45.143	39.645	12.18	39908.5	35047.1	12.181
884.05	0.999	13.834	14.601	-5.546	45.143	39.645	12.18	39953.6	35087.8	12.179
885.05	0.999	13.834	14.601	-5.547	45.143	39.645	12.179	39998.8	35126.9	12.18
886.05	0.999	13.834	14.601	-5.547	45.143	39.645	12.179	40043.9	35167.8	12.177
887.05	0.999	13.834	14.601	-5.547	45.143	39.645	12.179	40089	35207	12.178
888.05	0.999	13.834	14.601	-5.547	45.143	39.645	12.179	40134.2	35246.3	12.179
889.05	0.999	13.834	14.601	-5.547	45.143	39.645	12.179	40179.3	35285.6	12.18
890.05	0.999	13.834	14.601	-5.547	45.143	39.645	12.178	40224.5	35325.1	12.18
891.05	0.999	13.834	14.601	-5.547	45.143	39.645	12.178	40269.6	35366.5	12.176
892.05	0.999	13.834	14.601	-5.547	45.143	39.645	12.178	40314.8	35406.1	12.176
893.05	0.999	13.834	14.601	-5.548	45.143	39.646	12.178	40359.9	35445.8	12.176
894.05	0.999	13.834	14.601	-5.548	45.143	39.646	12.177	40405	35485.6	12.175
895.05	0.999	13.834	14.601	-5.548	45.143	39.646	12.177	40450.2	35523.6	12.179
896.05	0.999	13.834	14.601	-5.548	45.143	39.646	12.177	40495.3	35563.6	12.179
897.05	0.999	13.834	14.601	-5.548	45.143	39.646	12.177	40540.5	35603.6	12.178
898.05	0.999	13.834	14.601	-5.548	45.143	39.646	12.177	40585.6	35643.8	12.176
899.05	0.999	13.834	14.601	-5.548	45.143	39.646	12.176	40630.8	35684	12.175
900.05	0.999	13.834	14.601	-5.549	45.143	39.646	12.176	40675.9	35722.4	12.178
901.05	0.999	13.834	14.601	-5.549	45.143	39.646	12.176	40721	35762.9	12.176
902.05	0.999	13.834	14.601	-5.549	45.143	39.646	12.176	40766.2	35803.4	12.174
903.05	0.999	13.834	14.601	-5.549	45.143	39.646	12.176	40811.3	35842.1	12.176

904.05	0.999	13.834	14.601	-5.549	45.143	39.647	12.175	40856.5	35882.8	12.174
905.05	0.999	13.834	14.601	-5.549	45.143	39.647	12.175	40901.6	35921.6	12.176
906.05	0.999	13.834	14.601	-5.549	45.143	39.647	12.175	40946.8	35962.5	12.173
907.05	0.999	13.834	14.601	-5.549	45.143	39.647	12.175	40991.9	36001.5	12.174
908.05	0.999	13.834	14.601	-5.55	45.143	39.647	12.174	41037	36040.6	12.176
909.05	0.999	13.834	14.601	-5.55	45.143	39.647	12.174	41082.2	36081.7	12.172
910.05	0.999	13.834	14.601	-5.55	45.143	39.647	12.174	41127.3	36121	12.173
911.05	0.999	13.834	14.601	-5.55	45.143	39.647	12.174	41172.5	36160.4	12.173
912.05	0.999	13.834	14.601	-5.55	45.143	39.647	12.174	41217.6	36199.8	12.174
913.05	0.999	13.834	14.601	-5.55	45.143	39.647	12.173	41262.8	36239.3	12.174
914.05	0.999	13.834	14.601	-5.55	45.143	39.648	12.173	41307.9	36278.9	12.174
915.05	0.999	13.834	14.602	-5.55	45.143	39.648	12.173	41353	36318.7	12.174
916.05	0.999	13.834	14.602	-5.551	45.143	39.648	12.173	41398.2	36358.4	12.174
917.05	0.999	13.834	14.602	-5.551	45.143	39.648	12.173	41443.3	36398.3	12.173
918.05	0.999	13.834	14.602	-5.551	45.143	39.648	12.172	41488.5	36438.3	12.173
919.05	0.999	13.834	14.602	-5.551	45.143	39.648	12.172	41533.6	36478.3	12.172
920.05	0.999	13.834	14.602	-5.551	45.143	39.648	12.172	41578.8	36518.5	12.17
921.05	0.999	13.834	14.602	-5.551	45.143	39.648	12.172	41623.9	36556.7	12.174
922.05	0.999	13.834	14.602	-5.551	45.143	39.648	12.172	41669	36597	12.172
923.05	0.999	13.834	14.602	-5.551	45.143	39.648	12.171	41714.2	36637.4	12.17
924.05	0.999	13.834	14.602	-5.552	45.143	39.648	12.171	41759.3	36675.9	12.173
925.05	0.999	13.834	14.602	-5.552	45.143	39.649	12.171	41804.5	36716.4	12.171
926.05	0.999	13.834	14.602	-5.552	45.143	39.649	12.171	41849.6	36757.1	12.169
927.05	0.999	13.834	14.602	-5.552	45.143	39.649	12.17	41894.8	36795.8	12.171
928.05	0.999	13.834	14.602	-5.552	45.143	39.649	12.17	41939.9	36836.7	12.168
929.05	0.999	13.834	14.602	-5.552	45.143	39.649	12.17	41985	36875.5	12.17
930.05	0.999	13.834	14.602	-5.552	45.143	39.649	12.17	42030.2	36914.5	12.171
931.05	0.999	13.834	14.602	-5.552	45.143	39.649	12.17	42075.3	36955.6	12.168
932.05	0.999	13.834	14.602	-5.553	45.143	39.649	12.169	42120.5	36994.8	12.169
933.05	0.999	13.834	14.602	-5.553	45.143	39.649	12.169	42165.6	37034	12.17
934.05	0.999	13.834	14.602	-5.553	45.143	39.649	12.169	42210.8	37073.3	12.171
935.05	0.999	13.834	14.602	-5.553	45.143	39.649	12.169	42255.9	37114.7	12.167
936.05	0.999	13.834	14.602	-5.553	45.143	39.65	12.169	42301	37154.2	12.167
937.05	0.999	13.834	14.602	-5.553	45.143	39.65	12.168	42346.2	37193.8	12.167
938.05	0.999	13.834	14.602	-5.553	45.143	39.65	12.168	42391.3	37233.4	12.167
939.05	0.999	13.834	14.602	-5.553	45.143	39.65	12.168	42436.5	37273.1	12.167
940.05	0.999	13.834	14.602	-5.554	45.143	39.65	12.168	42481.6	37312.9	12.167
941.05	0.999	13.834	14.602	-5.554	45.143	39.65	12.168	42526.8	37352.8	12.166
942.05	0.999	13.834	14.602	-5.554	45.143	39.65	12.167	42571.9	37392.8	12.166
943.05	0.999	13.834	14.602	-5.554	45.143	39.65	12.167	42617	37430.7	12.17
944.05	0.999	13.834	14.602	-5.554	45.143	39.65	12.167	42662.2	37470.9	12.168
945.05	0.999	13.834	14.602	-5.554	45.143	39.65	12.167	42707.3	37511.1	12.167
946.05	0.999	13.834	14.602	-5.554	45.143	39.65	12.167	42752.5	37551.4	12.165

947.05	0.999	13.834	14.602	-5.554	45.143	39.651	12.166	42797.6	37589.7	12.169
948.05	0.999	13.834	14.602	-5.554	45.143	39.651	12.166	42842.8	37630.2	12.167
949.05	0.999	13.834	14.602	-5.555	45.143	39.651	12.166	42887.9	37670.8	12.165
950.05	0.999	13.834	14.602	-5.555	45.143	39.651	12.166	42933	37709.3	12.167
951.05	0.999	13.834	14.602	-5.555	45.143	39.651	12.166	42978.2	37750	12.165
952.05	0.999	13.834	14.602	-5.554	45.213	39.651	12.302	43090.5	37788.7	12.304
953.05	0.999	13.834	14.602	-5.554	45.213	39.651	12.302	43135.7	37829.6	12.301
954.05	0.999	13.834	14.602	-5.555	45.213	39.651	12.302	43180.9	37868.5	12.303
955.05	0.999	13.834	14.602	-5.555	45.213	39.651	12.302	43226.2	37909.6	12.3
956.05	0.999	13.834	14.602	-5.555	45.213	39.651	12.302	43271.4	37948.6	12.301
957.05	0.999	13.834	14.602	-5.555	45.213	39.651	12.302	43316.6	37987.7	12.302
958.05	0.999	13.834	14.602	-5.555	45.213	39.652	12.301	43361.8	38026.8	12.303
959.05	0.999	13.834	14.602	-5.555	45.213	39.652	12.301	43407	38068.3	12.299
960.05	0.999	13.834	14.602	-5.555	45.213	39.652	12.301	43452.2	38107.6	12.3
961.05	0.999	13.834	14.602	-5.555	45.213	39.652	12.301	43497.4	38147	12.301
962.05	0.999	13.834	14.602	-5.556	45.213	39.652	12.301	43542.6	38186.5	12.301
963.05	0.999	13.834	14.602	-5.556	45.213	39.652	12.3	43587.9	38226.1	12.301
964.05	0.999	13.834	14.602	-5.556	45.213	39.652	12.3	43633.1	38265.7	12.301
965.05	0.999	13.834	14.602	-5.556	45.213	39.652	12.3	43678.3	38305.5	12.301
966.05	0.999	13.834	14.602	-5.556	45.213	39.652	12.3	43723.5	38345.3	12.301
967.05	0.999	13.834	14.602	-5.556	45.213	39.652	12.3	43768.7	38385.2	12.3
968.05	0.999	13.834	14.602	-5.556	45.213	39.652	12.299	43813.9	38425.2	12.299
969.05	0.999	13.834	14.602	-5.556	45.213	39.652	12.299	43859.1	38465.3	12.298
970.05	0.999	13.834	14.602	-5.556	45.213	39.653	12.299	43904.4	38505.4	12.297
971.05	0.999	13.834	14.602	-5.557	45.213	39.653	12.299	43949.6	38543.4	12.301
972.05	0.999	13.834	14.602	-5.557	45.213	39.653	12.299	43994.8	38583.8	12.299
973.05	0.999	13.834	14.602	-5.557	45.213	39.653	12.299	44040	38624.2	12.298
974.05	0.999	13.834	14.602	-5.557	45.213	39.653	12.298	44085.2	38662.4	12.301
975.05	0.999	13.834	14.602	-5.557	45.213	39.653	12.298	44130.4	38703	12.299
976.05	0.999	13.834	14.603	-5.557	45.213	39.653	12.298	44175.6	38743.6	12.296
977.05	0.999	13.834	14.603	-5.557	45.213	39.653	12.298	44220.8	38782.1	12.299
978.05	0.999	13.834	14.603	-5.557	45.213	39.653	12.298	44266.1	38822.9	12.296
979.05	0.999	13.834	14.603	-5.557	45.213	39.653	12.297	44311.3	38861.6	12.299
980.05	0.999	13.834	14.603	-5.558	45.213	39.653	12.297	44356.5	38902.5	12.296
981.05	0.999	13.834	14.603	-5.558	45.213	39.653	12.297	44401.7	38941.3	12.298
982.05	0.999	13.834	14.603	-5.558	45.213	39.654	12.297	44446.9	38982.5	12.294
983.05	0.999	13.834	14.603	-5.558	45.213	39.654	12.297	44492.1	39021.4	12.296
984.05	0.999	13.834	14.603	-5.558	45.213	39.654	12.296	44537.3	39060.5	12.297
985.05	0.999	13.834	14.603	-5.558	45.213	39.654	12.296	44582.6	39099.6	12.299
986.05	0.999	13.834	14.603	-5.558	45.213	39.654	12.296	44627.8	39141.1	12.294
987.05	0.999	13.834	14.603	-5.558	45.213	39.654	12.296	44673	39180.3	12.295
988.05	0.999	13.834	14.603	-5.558	45.213	39.654	12.296	44718.2	39219.7	12.296
989.05	0.999	13.834	14.603	-5.559	45.213	39.654	12.296	44763.4	39259.1	12.296

990.05	0.999	13.834	14.603	-5.559	45.213	39.654	12.295	44808.6	39298.6	12.297
991.05	0.999	13.834	14.603	-5.559	45.213	39.654	12.295	44853.8	39338.2	12.297
992.05	0.999	13.834	14.603	-5.559	45.213	39.654	12.295	44899	39377.8	12.297
993.05	0.999	13.834	14.603	-5.559	45.213	39.654	12.295	44944.3	39417.6	12.297
994.05	0.999	13.834	14.603	-5.559	45.213	39.655	12.295	44989.5	39457.4	12.296
995.05	0.999	13.834	14.603	-5.559	45.213	39.655	12.295	45034.7	39497.3	12.296
996.05	0.999	13.834	14.603	-5.559	45.213	39.655	12.294	45079.9	39537.3	12.295
997.05	0.999	13.834	14.603	-5.559	45.213	39.655	12.294	45125.1	39577.4	12.294
998.05	0.999	13.834	14.603	-5.559	45.213	39.655	12.294	45170.3	39617.5	12.293
999.05	0.999	13.834	14.603	-5.56	45.213	39.655	12.294	45215.5	39657.7	12.292
1000.05	0.999	13.834	14.603	-5.56	45.213	39.655	12.294	45260.8	39695.7	12.296
1001.05	0.999	13.834	14.603	-5.56	45.213	39.655	12.293	45306	39736.1	12.294
1002.05	0.999	13.834	14.603	-5.56	45.213	39.655	12.293	45351.2	39776.5	12.292
1003.05	0.999	13.834	14.603	-5.56	45.213	39.655	12.293	45396.4	39814.7	12.296
1004.05	0.999	13.834	14.603	-5.56	45.213	39.655	12.293	45441.6	39855.3	12.293
1005.05	0.999	13.834	14.603	-5.56	45.213	39.655	12.293	45486.8	39896	12.291
1006.05	0.999	13.834	14.603	-5.56	45.213	39.655	12.293	45532	39934.4	12.294
1007.05	0.999	13.834	14.603	-5.56	45.213	39.656	12.292	45577.2	39975.3	12.291
1008.05	0.999	13.834	14.603	-5.561	45.213	39.656	12.292	45622.5	40013.8	12.294
1009.05	0.999	13.834	14.603	-5.561	45.213	39.656	12.292	45667.7	40054.9	12.291
1010.05	0.999	13.834	14.603	-5.561	45.213	39.656	12.292	45712.9	40093.6	12.293
1011.05	0.999	13.834	14.603	-5.561	45.213	39.656	12.292	45758.1	40134.8	12.289
1012.05	0.999	13.834	14.603	-5.561	45.213	39.656	12.292	45803.3	40173.6	12.291
1013.05	0.999	13.834	14.603	-5.561	45.213	39.656	12.291	45848.5	40212.5	12.293
1014.05	0.999	13.834	14.603	-5.561	45.213	39.656	12.291	45893.7	40254	12.289
1015.05	0.999	13.834	14.603	-5.561	45.213	39.656	12.291	45939	40293.1	12.29
1016.05	0.999	13.834	14.603	-5.561	45.213	39.656	12.291	45984.2	40332.2	12.291
1017.05	0.999	13.834	14.603	-5.561	45.213	39.656	12.291	46029.4	40371.5	12.292
1018.05	0.999	13.834	14.603	-5.562	45.213	39.656	12.291	46074.6	40410.8	12.293
1019.05	0.999	13.834	14.603	-5.562	45.213	39.656	12.29	46119.8	40452.6	12.288
1020.05	0.999	13.834	14.603	-5.562	45.213	39.657	12.29	46165	40492.1	12.288
1021.05	0.999	13.834	14.603	-5.562	45.213	39.657	12.29	46210.2	40531.6	12.289

1022.05	0.999	13.834	14.603	-5.562	45.213	39.657	12.29	46255.4	40571.3	12.289
1023.05	0.999	13.834	14.603	-5.562	45.213	39.657	12.29	46300.7	40611	12.289
1024.05	0.999	13.834	14.603	-5.562	45.213	39.657	12.29	46345.9	40650.7	12.288
1025.05	0.999	13.834	14.603	-5.562	45.213	39.657	12.289	46391.1	40690.6	12.288
1026.05	0.999	13.834	14.603	-5.562	45.213	39.657	12.289	46436.3	40730.5	12.287
1027.05	0.999	13.834	14.603	-5.562	45.213	39.657	12.289	46481.5	40770.5	12.287
1028.05	0.999	13.834	14.603	-5.563	45.213	39.657	12.289	46526.7	40808.1	12.291
1029.05	0.999	13.834	14.603	-5.563	45.213	39.657	12.289	46571.9	40848.3	12.29
1030.05	0.999	13.834	14.603	-5.563	45.213	39.657	12.289	46617.2	40888.5	12.289
1031.05	0.999	13.834	14.603	-5.563	45.213	39.657	12.288	46662.4	40928.9	12.287
1032.05	0.999	13.834	14.603	-5.563	45.213	39.657	12.288	46707.6	40969.3	12.286
1033.05	0.999	13.834	14.603	-5.563	45.213	39.658	12.288	46752.8	41007.2	12.289
1034.05	0.999	13.834	14.603	-5.563	45.213	39.658	12.288	46798	41047.8	12.287
1035.05	0.999	13.834	14.603	-5.563	45.213	39.658	12.288	46843.2	41088.4	12.285
1036.05	0.999	13.834	14.603	-5.563	45.213	39.658	12.288	46888.4	41126.6	12.289
1037.05	0.999	13.834	14.603	-5.563	45.213	39.658	12.287	46933.6	41167.4	12.286
1038.05	0.999	13.834	14.603	-5.564	45.213	39.658	12.287	46978.9	41205.7	12.289
1039.05	0.999	13.834	14.603	-5.564	45.213	39.658	12.287	47024.1	41246.6	12.286
1040.05	0.999	13.834	14.603	-5.564	45.213	39.658	12.287	47069.3	41285.1	12.289
1041.05	0.999	13.834	14.603	-5.564	45.213	39.658	12.287	47114.5	41326.2	12.286
1042.05	0.999	13.834	14.603	-5.564	45.213	39.658	12.287	47159.7	41364.8	12.288
1043.05	0.999	13.834	14.603	-5.564	45.213	39.658	12.286	47204.9	41406.1	12.284
1044.05	0.999	13.834	14.603	-5.564	45.213	39.658	12.286	47250.1	41444.8	12.286
1045.05	0.999	13.834	14.603	-5.564	45.213	39.658	12.286	47295.4	41483.7	12.288
1046.05	0.999	13.834	14.604	-5.564	45.213	39.658	12.286	47340.6	41525.2	12.284
1047.05	0.999	13.834	14.604	-5.564	45.213	39.659	12.286	47385.8	41564.2	12.286
1048.05	0.999	13.834	14.604	-5.565	45.213	39.659	12.286	47431	41603.2	12.287
1049.05	0.999	13.834	14.604	-5.565	45.213	39.659	12.285	47476.2	41642.4	12.288

1050.05	0.999	13.834	14.604	-5.565	45.213	39.659	12.285	47521.4	41684.2	12.283
1051.05	0.999	13.834	14.604	-5.565	45.213	39.659	12.285	47566.6	41723.5	12.284
1052.05	0.999	13.834	14.604	-5.564	45.287	39.659	12.427	47689	41762.8	12.427
1053.05	0.999	13.834	14.604	-5.564	45.287	39.659	12.427	47734.3	41802.2	12.427
1054.05	0.999	13.834	14.604	-5.565	45.287	39.659	12.427	47779.6	41841.8	12.428
1055.05	0.999	13.834	14.604	-5.565	45.287	39.659	12.426	47824.9	41881.3	12.428
1056.05	0.999	13.834	14.604	-5.565	45.287	39.659	12.426	47870.2	41921	12.428
1057.05	0.999	13.834	14.604	-5.565	45.287	39.659	12.426	47915.4	41960.7	12.428
1058.05	0.999	13.834	14.604	-5.565	45.287	39.659	12.426	47960.7	42000.5	12.427
1059.05	0.999	13.834	14.604	-5.565	45.287	39.659	12.426	48006	42040.4	12.427
1060.05	0.999	13.834	14.604	-5.565	45.287	39.659	12.426	48051.3	42080.4	12.426
1061.05	0.999	13.834	14.604	-5.565	45.287	39.66	12.426	48096.6	42120.4	12.425
1062.05	0.999	13.834	14.604	-5.565	45.287	39.66	12.425	48141.9	42160.5	12.425
1063.05	0.999	13.834	14.604	-5.565	45.287	39.66	12.425	48187.2	42200.7	12.423
1064.05	0.999	13.834	14.604	-5.566	45.287	39.66	12.425	48232.5	42238.3	12.428
1065.05	0.999	13.834	14.604	-5.566	45.287	39.66	12.425	48277.7	42278.6	12.426
1066.0	0.999	13.834	14.604	-5.566	45.287	39.66	12.425	48323	42319	12.425
1067.05	0.999	13.834	14.604	-5.566	45.287	39.66	12.425	48368.3	42359.5	12.423
1068.05	0.999	13.834	14.604	-5.566	45.287	39.66	12.424	48413.6	42397.4	12.427
1069.05	0.999	13.834	14.604	-5.566	45.287	39.66	12.424	48458.9	42438	12.425
1070.05	0.999	13.834	14.604	-5.566	45.287	39.66	12.424	48504.2	42478.7	12.423
1071.05	0.999	13.834	14.604	-5.566	45.287	39.66	12.424	48549.5	42516.8	12.426
1072.05	0.999	13.834	14.604	-5.566	45.287	39.66	12.424	48594.8	42557.6	12.423
1073.05	0.999	13.834	14.604	-5.566	45.287	39.66	12.424	48640	42595.9	12.426
1074.05	0.999	13.834	14.604	-5.566	45.287	39.66	12.424	48685.3	42636.9	12.424
1075.05	0.999	13.834	14.604	-5.567	45.287	39.661	12.423	48730.6	42678	12.421
1076.05	0.999	13.834	14.604	-5.567	45.287	39.661	12.423	48775.9	42716.4	12.423
1077.05	0.999	13.834	14.604	-5.567	45.287	39.661	12.423	48821.2	42754.9	12.426

1078.05	0.999	13.834	14.604	-5.567	45.287	39.661	12.423	48866.5	42796.2	12.422
1079.05	0.999	13.834	14.604	-5.567	45.287	39.661	12.423	48911.8	42834.9	12.424
1080.05	0.999	13.834	14.604	-5.567	45.287	39.661	12.423	48957	42876.3	12.421
1081.05	0.999	13.834	14.604	-5.567	45.287	39.661	12.422	49002.3	42915.1	12.422
1082.05	0.999	13.834	14.604	-5.567	45.287	39.661	12.422	49047.6	42954	12.424
1083.05	0.999	13.834	14.604	-5.567	45.287	39.661	12.422	49092.9	42995.7	12.42
1084.05	0.999	13.834	14.604	-5.567	45.287	39.661	12.422	49138.2	43034.7	12.421
1085.05	0.999	13.834	14.604	-5.567	45.287	39.661	12.422	49183.5	43073.8	12.422
1086.05	0.999	13.834	14.604	-5.568	45.287	39.661	12.422	49228.8	43112.9	12.423
1087.05	0.999	13.834	14.604	-5.568	45.287	39.661	12.422	49274	43152.1	12.424
1088.05	0.999	13.834	14.604	-5.568	45.287	39.661	12.421	49319.3	43194.2	12.419
1089.05	0.999	13.834	14.604	-5.568	45.287	39.661	12.421	49364.6	43233.6	12.42
1090.05	0.999	13.834	14.604	-5.568	45.287	39.662	12.421	49409.9	43273	12.42
1091.05	0.999	13.834	14.604	-5.568	45.287	39.662	12.421	49455.2	43312.5	12.421
1092.05	0.999	13.834	14.604	-5.568	45.287	39.662	12.421	49500.5	43352.1	12.421
1093.05	0.999	13.834	14.604	-5.568	45.287	39.662	12.421	49545.8	43391.8	12.421
1094.05	0.999	13.834	14.604	-5.568	45.287	39.662	12.421	49591.1	43431.5	12.421
1095.05	0.999	13.834	14.604	-5.568	45.287	39.662	12.42	49636.3	43471.3	12.421
1096.05	0.999	13.834	14.604	-5.568	45.287	39.662	12.42	49681.6	43511.1	12.42
1097.05	0.999	13.834	14.604	-5.568	45.287	39.662	12.42	49726.9	43551.1	12.42
1098.05	0.999	13.834	14.604	-5.569	45.287	39.662	12.42	49772.2	43591.1	12.419
1099.05	0.999	13.834	14.604	-5.569	45.287	39.662	12.42	49817.5	43631.2	12.418
1100.05	0.999	13.834	14.604	-5.569	45.287	39.662	12.42	49862.8	43671.3	12.417

Data values: $H_0=66.89$ km/sec/Mpc; Matter density%=0.32%; Dark energy density %=0.68% Thermal energy density %=0%

Discussion

We would like to emphasize the fact that, the basic principles of cosmology were developed when the subject of cosmology was in its budding stage. Friedmann made two simple assumptions about the universe [50]. They can be stated in the following way.

- When viewed at large enough scales, universe appears the same in every direction.

- When viewed at large enough scales, universe appears the same from every location.

In this context, Hawking expressed that: “There is no scientific evidence for the Friedmann’s second assumption [51]. We believe it only on the grounds of modesty: it would be the most remarkable if the universe looked the same in every direction around us, but not around other points in the universe”. Proceeding further, current galactic observations and advanced technology raise many doubts on the validity of Friedmann’s first assumption. It may be noted that,

- There is no clear cut mechanism for understanding big bang.
- Whether big bang followed known physical laws or not - is unclear and unknown.
- Mass and size of universe pertaining to pre and post big bang are unclear.
- Applying Planck scale physics to big bang notion seems to be ambiguous.
- As there exist no clear reasons for understanding the occurrence of exponential expansion, cosmologists are having different opinions on cosmic inflation.
- So far, it has not yet been possible to establish solid connection between Planck scale and current physical parameters of the observable universe.
- Cosmologists are having different opinions on dark energy and dark matter.
- So far, no observation and no experiment confirmed the existence of dark energy or dark matter.
- Quantum cosmology is in its budding stage and cosmologists are seriously working on quantum models of cosmology [52-54].
- No cosmologist is clear about the origin of cosmic thermal radiation [55]. In this context, our proposed model of quantum cosmology is practical and very simple to follow [18-21].
- To have rotation, universe should have a closed or positive curvature. Three most recent technical papers [56,57,58] published in three very high impact journals seem to support a closed universe. In this context, we would like to recall the views of Di Valentino, Melchiorri and Silk [56]. According their analysis and interpretation, observed enhanced lensing amplitude of cosmic microwave background radiation can be explained with a positive curvature of the universe at 99% confidence level. According to George Ellis and Julien Larena, the possibility that the universe might be positively curved, although it would not solve all the existing tensions at once, opens exciting theoretical possibilities for cosmology [57]. Proceeding further, according to Will Handley - In light of the inconsistency between Planck, CMB lensing and BAO data in the context of curved universes, cosmologists can no longer conclude that observations support a flat universe [58].
- Hubble’s observations can also be studied with rotating and expanding models of cosmology [30].

As per the papers published in Astronomical Journal 2012 and Nature-Scientific Reports 2016, data pertaining to 580 to 740 super novae clearly reveal that, universe is expanding at an uniform rate [13, 21]. In 2018-2019, the same result has been obtained by a student Lisa Goh Wan Khee of National University of Singapore supervised by Cindy Ng [59]. This information can be considered as a base for light speed cosmic expansion.

Here it seems reasonable to consider the views of Moshe Carmeli and team on red shift dependent cosmic time. It can be expressed

as, $t = \frac{2H_0^{-1}}{1+(1+z)^2}$. This relation and our proposal, both, seem to cast doubt on the currently believed cosmic red shift-time relation

[60]. In addition to that, based on our proposal, above expression can also be expressed as, $t = \frac{2H_0^{-1}}{1+(1+z)^2} = \left(\frac{H_0 + H_t}{2} \right)^{-1}$ where

$$(1+z)^2 H_0 \cong H_t.$$

Now, the fundamental question to be answered is: Maintaining their black hole nature as-it-is, how massive black holes will grow in the expanding universe? In this context, recently, K.S. Crocker and team proposed that, during cosmic expansion and increasing cosmic age [61],

- All material particles will grow in their mass content while universe is expanding.
- Massive objects like black holes will have a significant increase in their mass content [62].
- This mechanism can be called as ‘Cosmological coupling’.
- Magnitude of cosmological coupling increases with increasing mass of the object.
- In case of observed massive black holes this seems to be true and this mechanism can be recommended for testing in near future.

Based on our proposal, if universe is really a black hole and is really expanding with speed of light, then, forever, maintaining its black hole structure ‘as-it-is’, universe can be expected to have an increase in mass during its light speed expansion [18].

Conclusion

Considering the four major cosmological coincidences proposed in previous sections, there is a scope for reviewing the standard model of cosmology. In reality, it is absolutely impossible to reach the core of a black hole. Following our approach, it seems practically possible to swim in the light speed expanding or growing black hole universe. Physicists agree that Hawking’s findings about black holes are the most important contributions to physics in recent decades. In this context, we appeal the science community to review our simple and logical proposals for a better understanding of cosmic physics in terms of light speed expanding black hole universe having thermal radiation.

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