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A Brief Overview on Galaxies in Timeline Order

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Abstract

Here, I present an alternate solution for the dark matter problem. I show that the stars of a galaxy's arm attract each other with a force (beyond gravity) that produces a chain of stars. We already have an abundance of data (ring and multiring galaxies) as proof of the existence of this strong stars chain. This attraction force effect may only be present between stars or perhaps black holes but not any other matter such as gases in the interstellar medium or planets. Its effect does not end at the galaxy's boundaries but gets deeper into the cosmos and may explain the dark energy problem. I also offer a novel timeline order for the well-known galaxies using Hubble classification.

Keywords: Dark matter; Dark energy; Galaxy evolution; Gamma rays; Abundance

Introduction

In 1933, Fritz Zwicky found anomalies in the motion of some galaxies [1]. In 1970, Vera Rubin discovered that the angular velocity is the same for every star within an arm [2]. Since then, we know there must be an attraction force other than gravity that does not allow the stars in the suburb to fly apart from the galaxy. How strong is that attraction force? If our solar system worked the same way and Neptune had the same angular velocity as earth, it would mean that this force is 164 times stronger than gravity. Why do we not see any other trace of such a strong force, the way we could gather information about a supermassive black hole in the middle of the M87 galaxy even before the famous image was taken? [3]. This force certainly does not work within our solar system because everything obeys gravity here; on the other hand, our sun is on an arm of a galaxy, so this mysterious force should have some effect on it.

Materials and Methods

The concept is that the photon's trajectory is actually a type of wormhole. It connects distant points in space time with no space and no time inside it. The entangled particles live in the same "Y" shaped wormhole, so the distance is zero between them. That should be the basis of calculations for the gravitational force between these particles instead of the distance observed. Therefore, they attract each other with the same force regardless of their distance [4]. The effect of this force may also be seenin photonic molecules [5]. A novel quantum mechanics model based on this concept was reported recently explaining many phenomena and making quantum mechanics easier to understand [6]. The entangled state is a very fragile state on planets but may last much longer in the plasma of stars. The fact that a photon freshly born in the core of the Sun needs millions of years to reach the surface is well-known [7]. Therefore, a particle that goes in the opposite direction needs the same time more particlesmean even more time. This may explain why only stars and not planets attract each other. Therefore,if the entangled particles hit different stars, we may call them "entangled stars." The attraction force between them is called "entanglement force" in this paper. The next question is how the twin particles may hit different stars. There must be many ways, but I offer two major possible scenarios. The first one happens, when a Supermassive Black Hole (SMBH) consumes a star and then burps a part of it [8]. This matter should contain many entangled particles that hit different stars. The other case is due to Gamma Ray Bursts (GRBs). A GRB emits two thin rays that may have more energy than the sun willprovide over its entire 10 billion year lifetime. The light curves of GRBs are very different [9]. Usually, we speak of a "short" population with an average duration of about 0.3 seconds and a "long" population with an average duration of about 30 seconds. The two thin rays are full of entangled particles, but it is impossible for them to be released in opposite directions. It is also not possible that one of them be released earlier than the other with a separate peak (for this reason; I usually mark them in different colors). Let us see if the key fits the lock.

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Results and Discussion

First stage, A GRB occurs

Let us consider a young galaxy similar in appearance to an elliptical galaxy (E0 type) that works like our solar system. The stars on the outer orbits are orbiting with lower angular velocities. As I mentioned above, the SMBH eats a star and burps back a part of it that hits many stars in a sphere (we call this sphere a bulge), so these galaxies always have bulges and I call this type of SMBH a first Generation Supermassive Black Hole (1GSMBH).

Elliptical and lenticular galaxies: A GRB that occurred outside hits our young galaxy.

Animation 1: There is a very low chance that the GRB hits only a part of the galaxy. As a result, each star attracts the others by the entanglement force, so they will not orbit with different angular velocities. They move together as if they were one rigid object an inevitability, each star makes some extra random movements, but we may ignore that. Therefore, we may characterize the motion of these stars with their center of mass. This point probably differs from the 1GSMBH, so its movement determines the shape of this galaxy. If it orbits very slowly around the 1GSMBH, we get an E0 type elliptical galaxy (Figure 1). If this point orbits at a higher velocity, we get a flattening type of galaxy. Finally, if it whirls around extremely quickly, the result is a disc, a lenticular galaxy type. The very same process works within the bulge of galaxies, only the reason is different.

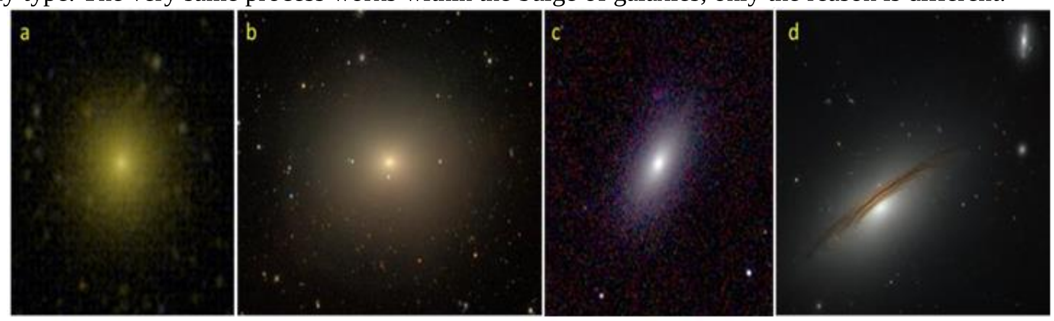

FIG. 1. **Images from the NASA/ESA Hubble space telescope. a) NGC 1379 E0 type elliptical galaxy; b) NGC 5322 E3 type elliptical galaxy; c) NGC 0720 E5 type elliptical galaxy; d) UGC 12591 is a lenticular type of galaxy that whirls around extremely quickly.**

Barred spiral galaxy: A GRB occurs in the center that hits the galaxy from the inside.

Animation 2: We get a barred spiral galaxy with two or more, but even arms that are usually symmetrical. Supposing the concept is right, stars on the same arm attract each other stronger than gravity. The long arms are created due to a big difference between the angular velocity of an outer star and an inner star at the moment of the blast. The same is true for other types of spiral galaxies (Figure 2). The arms seem blurry because it takes time for the stars to find their proper place many were orbiting in the opposite direction. The others will join the arms later, e.g. for an external GRB, the strong entangled stars' chain will pull them inside the arm caused by this new connection. The branch arms fuse later for the same reason.

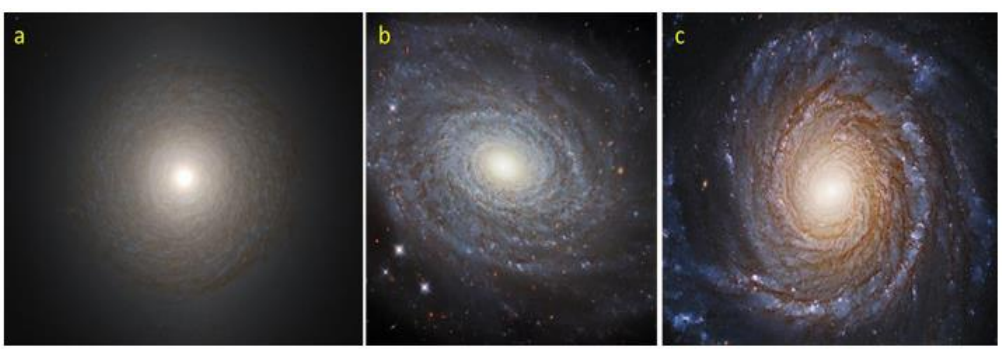

FIG. 2. **Images from the NASA/ESA Hubble space telescope. Galaxies with long blurry arms. a) NGC 1387 has very long arms; it is also classified as a lenticular type of galaxy; b) NGC 691; c) NGC 3147.**

Animation 3: If the GRB light curve has two or more peaks, we get more branch arms because the blasting star may rotate between the peaks. We get a straight line of stars within the bulge as these stars have already stopped orbiting at different angular velocities. I suppose the following statements are true. The bar is always longer than the bulge as the latter shrinks over time. The entangled twins of a bulge's star are within the sphere of the bulge, so the sum of the entanglement forces must point to the inside. Therefore, it shrinks every barred spiral galaxy must have had a bulge. Vice versa, if a spiral galaxy has a bulge and an arm going through on it, this arm must also contain a bar (Figure 3).

FIG. 3. **Images from the NASA/ESA Hubble space telescope. Barred spiral galaxies. The bar is longer than the bulge. a) NGC 1398 has long arms; b) NGC 1300; c) NGC 4535.**

Unbarred spiral galaxy with a bulge: A GRB occurs outside the center and hits the galaxy from the inside.
Animation 4: The arms are not symmetrical, the arms and the bulge are separated (Figure 4).

FIG. 4. **Images from the NASA/ESA Hubble space telescope. a) NGC 1566 unbarred spiral galaxy,the distance between the bulge and the arm is visible. b) NGC 1232 is also an unbarred spiral galaxy; c) NGC 2336 is a barred spiral galaxy. It seems to have been caused by two different GRBs, the first one occurring outside the center, causing the asymmetrical arms and the second one occurring later, inside the core that produced the bar.**

Proof that each arm lives its own unique life: It shows the Figure 5.

FIG. 5. **Images from the NASA/ESA Hubble space telescope. NGC 4622 had two leading outer armsin the past rotating counterclockwise and it had one inner arm rotating in the opposite direction, as wemay see it from the shape of the galaxy.**

Now, each arm rotates in a clockwise direction. It has probablybeen caused by an outer GRB that occurred later. I suppose they will all fuse in one ring.

Second stage, intermediate state, between the spiral and the ring galaxy

An elliptical galaxy does not change much; it does not shrink like the bulge because the sum of the entanglement forces points outside, toward the direction where the GRB occurred. Therefore, the wholegalaxy moves in that direction [10,11].

Spiral galaxies evolve very similarly. The chain of entangled stars shrinks (shortens) in a direction pointing to the arm's center of mass. Besides angular velocities, radial velocities begin to resemble (Figure 6).

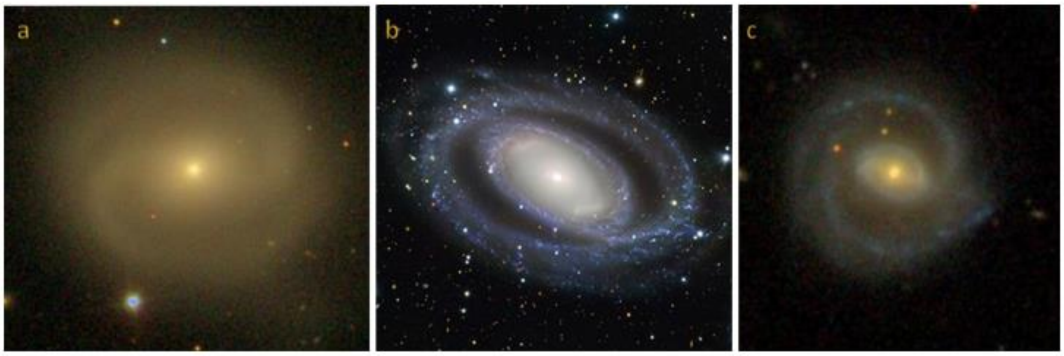

FIG. 6. **Images from the NASA/ESA Hubble space telescope. These spiral galaxies are forming a ring shape. a) NGC 7743; b) NGC 7098 is going to have two rings; c) NGC 4935.**

Third stage, Obeying Kepler's third law: Ring galaxies

As the chain of stars shrinks more and more, it may break. Because of the entanglement force, all thestars in the chain have almost the same angular velocity and radial velocity. Thus, each star goes intothe same orbit, obeying Kepler's third law. That is why we observe a ring. If different arms have differentaverage velocities, we get more than one ring. Vice versa, if we see a ring galaxy, we see that almost all the stars are inside the ring; hence, they all have the same orbit and the same velocity at given points of the orbit, which was certainly not true in the past. As a result, they must attract each other stronger than gravity, so they form a chain of stars. Therefore, the perfect proof for the existence of the stars' chain is the multiring galaxy (Figure 7).

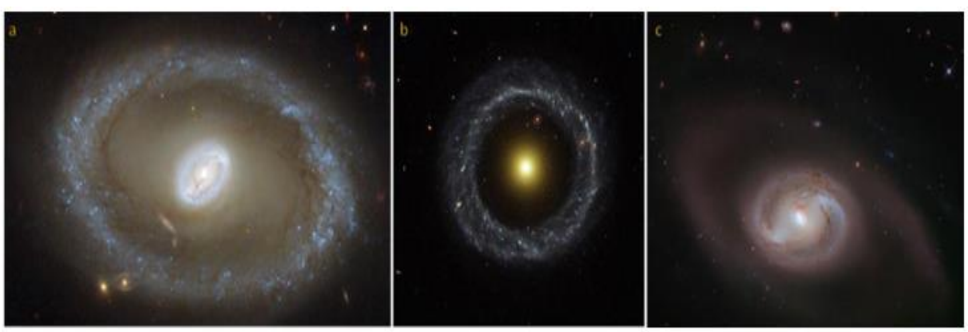

FIG. 7. **Images from the NASA/ESA Hubble space telescope. Ring galaxies: The stars use the same orbit, so they must have the same velocity. a) NGC 3081; b) Hoag's object: Another ring galaxy within the ring galaxy. Therefore, ring galaxies should be fairly common with millions of examples; c) NGC 2273 is a multiring galaxy that has two rings, so there are two different average velocities.**

Fourth stage, a new SMBH is to be born

The ring (or rings) shrink(s) towards its center of mass. The region becomes much brighter. At that point, many stars collide directly without spinning around each other as magnets do, producing a black hole because of the entanglement force. As the black hole consumes more and more stars its mass increases greatly and becomes an SMBH. So gravity regains control and starts to wind the ring of starsin a spiral shape. I call this type of black hole a second Generation Supermassive Black Hole (2GSMBH). Rings are nearly flat, so 2GSMBHs usually do not produce a major spherical bulge, only possibly a small one (Figure 8).

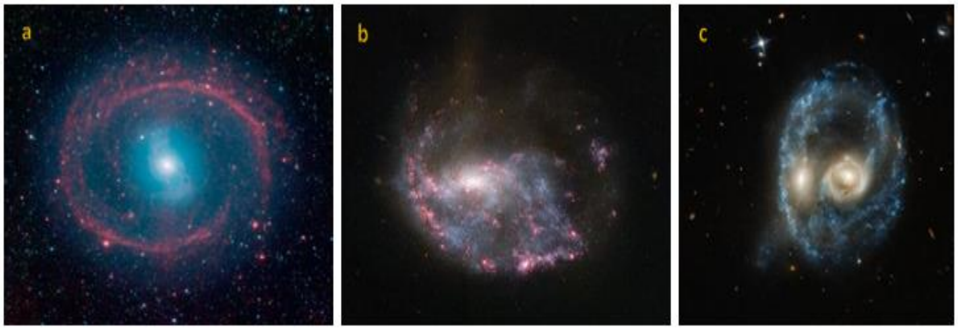

FIG. 8. **Images from the NASA/ESA Hubble space telescope. a) NGC 1291: Two regions are brighter than the others are, two new SMBHs may be born; b) NGC 922 c) Arp-Madore 2026-424, a new 2GSMBH has been born from the ring.**

Fifth stage, the 2GSMBH promotes the formation of a spiral. These galaxies do not collide but split

The galaxy splits into two or more parts and the core of the original galaxy remains there alone, usually without its long arms it becomes a dwarf galaxy. The newborn 2GSMBH is forming the ring into a spiral galaxy. It does not have a big bulge, so it may not become a barred spiral galaxy, but a small bar may be conceivable. The splitting galaxies must be in the same plane for a while because they used to be a part of the same disc. The probability for these galaxies colliding with their edges is extremely low, so they must split (Figure 9).

FIG. 9. **Images from the NASA/ESA Hubble space telescope. All galaxies are still in the same plane. a) ARP 273: We may see at the bottom of the picture that the original galaxy had been a barred spiralgalaxy that lost its arms. The spiral galaxy at the top is forming a new ring. Both use the same plane; b) M 51 has no bar because it is forming the ring into a spiral; c) NGC 6050 splits into three parts theoriginal 1GSMBH is probably the left one. At the top, there may be a newborn SMBH; d) ARP 274: Sometimes, the oldest remains the biggest, as we may see in this picture. The middle one has the original 1GSMBH because it has a big bulge and its stars are yellow. The others are 2GSMBHs havingblue stars. It is unbelievable that three galaxies collide and all three meet with their edges.**

Sixth stage, it repeats over and over

After the fifth stage, we usually get a lone galaxy center a dwarf galaxy without its arms and its rings and we get a new spiral galaxy or more. The spiral galaxy becomes a ring galaxy that splits again. Asthis process repeats over and over, we may get many galaxies as a result. Frequently, all but one of them is dwarf galaxies. Only the original 1GSMBH may have a big bulge and halo (Figure 10).

FIG. 10. **Images from the NASA/ESA Hubble space telescope. a) Cartwheel galaxy; b) Stephan's Quintet; c) AM 0644-741 surroundings have five more galaxies.**

Structure of the universe. Why do galaxies fly apart?

Let us suppose that in a young galaxy that works similarly to our solar system, a GRB occurred, havingtwo thin rays, one going left and hitting some galaxies there and the other going right. As it may fall apart later, some parts may move toward galaxies on the left side and some others may move toward the right hand side galaxies. Because of the entanglement force, the motion accelerates along this line, resulting in a web like structure of the universe, not a knotty one [12]. It is known that the Milky Way and Andromeda will collide in the future [13]. The reason may be that one of them had a GRB inside that hit the other galaxy. Without an attraction force between them beyond gravity, the probability of such a collision is almost zero, considering the huge distance.

Conclusion

The bottom line of this paper is that we already have data each ring galaxy proving the existence of a strong stars' chain. A ring galaxy may be seen as a necklace around the core or children walking hand in hand. Therefore, we should believe our eyes: The stars orbit "hand in hand." Current mainstream theory is that ring galaxies are formed as the result of a collision with the bulge staying in place. The problem with this theory is that current observations suggest ring galaxies as fairly common, while such collisions must be very unlikely. It also has no explanation for the multiring structure.

According to the theory, it is impossible to find a spiral galaxy with a big bulge and an arm going through the core but no bar. Collisions where galaxies meet with their edges are also unlikely, supporting the concept. Another proof is the NGC 4622 galaxy, in which the orbiting direction varied from arm to arm in the past, confirming that each arm used to represent a unique stars' chain.

Many statements of this paper may be confirmed by collecting more data, e.g. on every ring shrinking towards its center of mass or proof for the presence of fewer dwarf galaxies in the past, etc.

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