Dark matter and quantum entanglement

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Abstract

This paper explores the possibility of unifying the four fundamental forces with dark matter and quantum entanglement. It was found that when dark matter has quantum entanglement, the dark matter vortex forms and the dark matter outside the vortex will expand. This will slow down the matter and dark matter being involved in the vortex. The dark matter inside the vortex will also expand under the effect of the rotating compression force. The expansion force is proportional to the internal rotation speed of the vortex. From the edge to the core, the expansion force increases with the increase of the rotational compression force, and the dark matter at the core expands the most. When matter spirals into the center of a vortex, it forms a compressive force through its spin, which compresses dark matter towards the core, creating a gravitational layer. Outside this gravitational layer, dark matter is compressed and expands, forming a high expanded zone with a diameter equal to the radius of the gravitational layer. This creates four concentric layers from the center to the outer edge of the vortex: the gravitational layer, the high expanded zone outside the gravitational layer, the expansion-compression zone, and the outer expansion zone of the vortex. The high expanded zone is within the expansion-compression zone. The smallest vortices have only the gravitational layer and the outer expansion zone, without the expansion-compression and high expanded zones. The largest vortex is the universe, which has no external expansion zone. The density of the gravitational layer and the outer expansion zone can be controlled by controlling the rotation speed of dark matter vortices. This principle can also be used to control dark matter vortices for nuclear fission and fusion, create aircraft, and control and form celestial bodies and black holes.

Key words: dark matter, quantum entanglement, double helix, vortex, superposition state

The spin of elementary particles and the expansion of dark matter are intrinsic properties of both. Elementary particles rotate left and right at the same time, driving the rotation of dark matter. Thus, dark matter is in a superposition state. Dark matter expands to form an impact force, causing dark matter to form a vortex. The vortex rotates left and right at the same time. The dark matter vortex thus caused is in a superposition state of left-rotating and right-rotating (Ciri, Bettoni & Galletta 1995). Celestial bodies form at the center of the vortex of dark matter.

(I) The cause of vortex

The formation of vortices is closely related to dark matter. The spin of elementary particles drives the rotation of dark matter. On a microscopic level, a particle with spin 0 can split into two particles with opposite spins. In the macroscopic world, magnetic fields with the same direction of rotation repel each other, while magnetic fields with opposite directions of rotation attract. This suggests that dark matter may have a left-rotating and right-rotating double-helix structure. Since dark matter has a double-helix structure, it can be inferred that the smallest elementary particles have a left-rotating and right-rotating double-helix structure. The spin of particles drives the rotation of dark matter. Because the arrangement of particles is unordered, the rotation of dark matter is also chaotic. When matter moves or dark matter expands, it experiences impact forces. Part of this impact force is converted into rotational force, forming vortices (Girart et al. 2009), similar to the mushroom cloud formed by an atomic explosion (McKee & Stone 2021). Due to quantum entanglement of dark matter, when a dark matter vortex forms, the dark matter outside the vortex expands. The expansion distance is equal to the vortex radius. The expansion force decreases from the edge of the vortex outward, while the density of dark matter increases from the edge outward. The expansion force is proportional to the vortex's rotational speed, which slows down the process of matter and dark matter being drawn into the vortex. Inside the vortex, dark matter also expands due to rotational compressive forces (Menon & Ciotti 1970). The magnitude of the expansion force is proportional to the vortex's rotational speed. From the edge to the core, the expansion force increases with the growing rotational compressive force, with the core of the vortex experiencing the maximum expansion force and the minimum density. The rotation of dark matter vortices forms a rotational axis. After compression, this rotational axis expands, creating an expanded rotational axis. This describes the density structure of dark matter inside the vortex when it is first formed. Due to the expansion of both the vortex's interior and its rotational axis, along with the expansion outside the vortex, dark matter in the vortex is primarily concentrated near the equatorial plane close to the inner edge of the vortex. The density of dark matter decreases as it approaches the rotational axis, making it harder for high-mass matter to exist. The expansion of the rotational axis causes the matter inside the vortex to move toward the core and form spherical celestial bodies, rather than cylindrical ones. In atomic vortices, although the rotational axis expands, electrons can still exist at the axis because of their small mass and the relatively low expansion force outside the vortex. When matter is compressed into the center of a vortex, its spin generates a rotational compressive force that compresses dark matter towards the core. Due to this compressive force from both the matter's spin and the vortex's rotation, a gravitational layer form. For a given mass, the faster the rotation speed of the core material, the higher the density of dark matter in the gravitational layer, and the shorter the radius of the gravitational layer. For the same rotation speed, a larger core mass results in a longer radius of the gravitational layer. Outside the gravitational layer, dark matter expands due to the compressive forces exerted by the gravitational layer. This expansion creates a high expanded zone beyond the gravitational layer. In this high expanded zone, the expansion force is equal to the pressure experienced by the gravitational layer. This equality refers to a three-dimensional correspondence, where the change in distance is the same. The closer a region is to the gravitational layer, the greater the expansion force. The diameter of the high expanded zone is equal to the radius of the gravitational layer, which is the distance from the edge of the gravitational layer to its center. The high expanded zone is adjacent to the gravitational layer within the expansion-compression zone. The expansion force in the expansion-compression zone is related to the vortex's rotational speed. The faster the vortex rotates, the greater the vortex's compressive force, leading to increased expansion force within the zone and reduced density. In this case, the gravitational layer will rotate more rapidly, resulting in increased density and a shorter diameter. At the same time, the diameter of the high expanded zone outside the gravitational layer also decreases, leading to increased expansion force and decreased density (see Figure 1). The higher the vortex's rotational speed, the greater the differences among the expansion-compression zone, the high expanded zone, and the gravitational layer. In extreme cases, the density discrepancy between the gravitational layer and the high expanded zone can be immense. Very few light rays can traverse the high expanded zone and reflect back, and internal electromagnetic waves are rarely able to pass through the high expanded zone and be emitted. As a result, the core appears as a black hole. As dark matter expands from the edge to the core of the vortex, its density decreases. When dark matter and matter rotate and compress towards the center of the vortex, a resistance form. Thus, smaller particles, with less rotational force and lower density, can be compressed closer to the vortex center. In contrast, larger particles with higher core density and a larger external expansion coefficient cannot be compressed into the vortex center. As dark matter forms turbulence, it rebounds and creates new vortices (Cameron 1962). Thus, a large vortex can contain multiple smaller vortices (Burbidge 1962), which also explains why a galaxy contains many celestial bodies (Federrath et al. 2021). Since the vortex's rotation axis is an expanding axis, the more core material there is, the faster the vortex rotates and the greater the expansion force of the axis. Therefore, the rotation axis must be in an expanding state. The Fermi bubbles at the upper and lower ends of the Milky Way's center are formed due to the expansion of the rotation axis and the rotation of the axis, which prevent material from escaping or accumulating. Each vortex rotates around an expanding rotation axis rather than the core itself, whether at the scale of particles or celestial bodies and galaxies (Ashley et al., 2022).

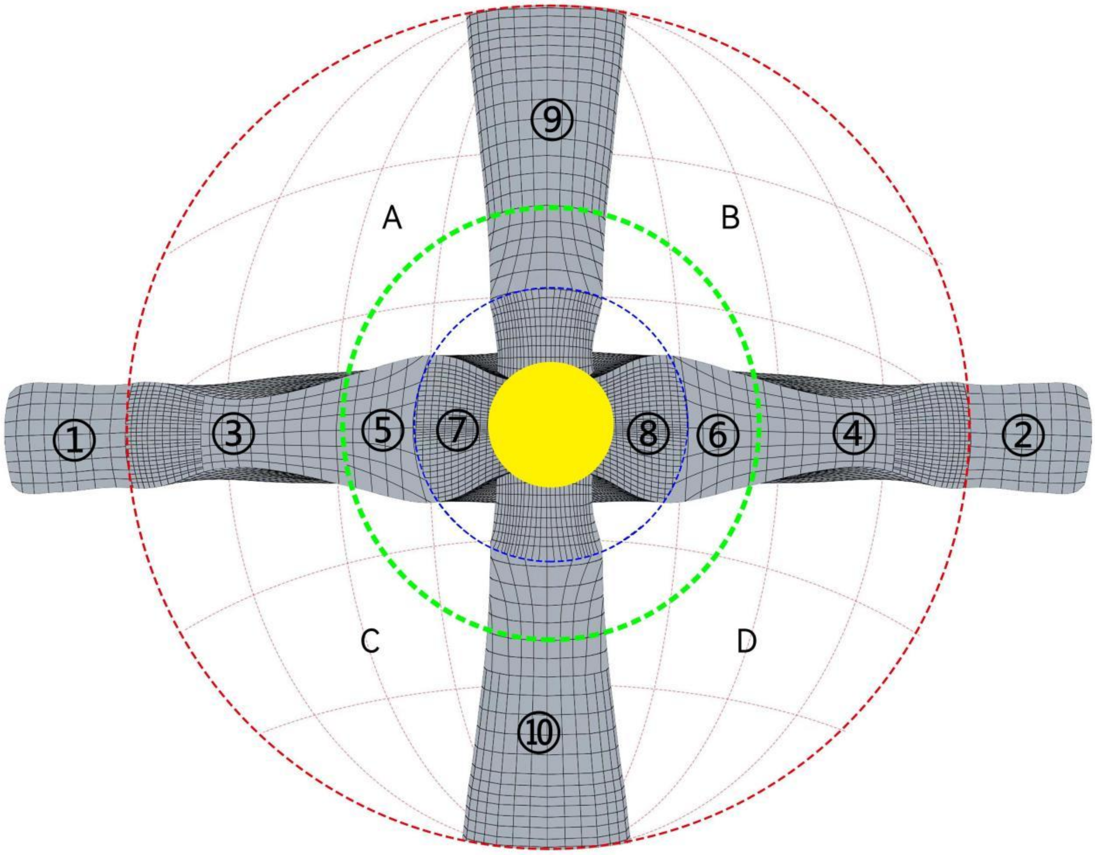

Fig. 1: The area within the red dotted line represents the entire spherical dark matter vortex. The yellow area in the vortex represents the core celestial body or material of the vortex. ① and ② outside the red dotted line represent the dark matter outside the vortex, covering the entire spherical vortex. As it extends outward from the red dotted line, the density gradually increases, and the expansion distance equals to the radius of the inner vortex of the entire red dotted line. The expansion compression zone is from the red dotted line to the blue dotted line, where ③ and ④

between the red dotted line and the green dotted line are the low expansion compression zone, and ⑤ and ⑥ between the green dotted line and the blue dotted line are the high expansion compression zone. The distance from the green dotted line to the blue dotted line is consistent with that from the blue dotted line to the center of the yellow sphere. A, B, C and D are also expansion compression zones. The density gradually decreases from the red dotted line to the blue dotted line, which is consistent with ③ and ⑤. The density of dark matter decreases gradually from the equator to the axis of rotation. ⑦ and ⑧ represent the gravitational layer, and also represent the equatorial region of the gravitational layer. The density gradually increases from the blue dotted line to the center of the yellow area. ⑨ and ⑩ represent the rotation axis of the entire vortex. The density gradually decreases from the red dotted line to the blue dotted line edge, and gradually increases towards the equator.

① **Take the solar system as an example**

After the dark matter vortex forms, the outside dark matter expands, and the inside dark matter rotates and compresses the hydrogen element to the vortex center to form the sun. Other heavy elements form planets, and those far from the vortex core can also form gaseous planets. Planets rotate around the vortex center driven by dark matter. Take mercury as an example: mercury rotates around the vortex center driven by dark matter. As mercury's vortex approaches the sun, the density of dark matter outside the vortex decreases, resulting in greater thrust from the expansion. When mercury is pushed toward its perihelion, the compressive force of the sun's vortex, combined with mercury's inertia and the dark matter expansion force between mercury's vortex and the sun, reaches a balance, preventing it from approaching the sun any closer. Under the rotation and thrust of the sun's vortex, mercury's vortex slides forward, causing perihelion precession. When mercury's inertia is counteracted by the expansion force of the dark matter outside its vortex, the expansion rebound of the dark matter outside mercury's vortex causes mercury to orbit the sun while moving away from it. At this point, the magnitude of the expansion rebound force of mercury's vortex is equal to the inertia force from mercury's forward motion. When mercury reaches its aphelion, the rebound force is fully counteracted by the compressive force from the dark matter vortex of the sun. The rotation and compression of dark matter push the mercury to get closer to the sun as it orbits it. Thus, mercury's orbit around the sun is elliptical. All celestial bodies in the universe have elliptical orbits, regardless of electrons, celestial bodies or galaxies. The moon is tidally locked to earth due to the strong compressive force of earth's dark matter vortex. This compression brings the moon's vortex close to earth, placing it in a region of high expansion within earth's gravitational field. As a result, the density of dark matter outside the moon's atomic vortex decreases, leading to an increased expansion force. Similarly, the expansion force in the outer region of earth's gravitational field increases. Consequently, while the moon's vortex can approach earth, the moon cannot enter earth's gravitational field. This leads to the moon being tightly locked, unable to rotate with its own vortex or rebound away. In this case, the following two cases happen. Case 1: If the radius of the vortex where the moon is located is small, its edge cannot contact the earth. The expansion of dark matter outside the vortex where the moon is located compresses the earth's space, causing it to retreat. As the earth retreats, the space on the side backing on to the moon will also be compressed. As a result, the sea water on both sides of the earth facing the moon and backing on to the moon will reduce due to the compression. Thus, a spherical concave surface is formed. The sea on earth's side not facing the moon does not experience this compression and thus does not have a corresponding tidal rise. Due to the sun's vortex driving the rotation of earth's vortex, the compression of earth's vortex by the sun's vortex causes it to become flattened, resulting in tidal phenomena. The earth is compressed the most and the tide is the greatest when the earth, moon and sun are in a straight line. The expansion zone outside the lunar vortex is close to the earth, and the compression force is large. The dark matter vortex of the sun compresses that of the earth. The vortex where the earth is located has a large diameter, which can disperse compression force. The earth, being at the core of its vortex, experiences less pressure from the sun's vortex compared to the moon's vortex, and so the moon plays a major role in the earth's tides. Case 2: If the vortex where the moon is located wraps a part of the earth, the seawater in the overlapping part rises, the rest of the seawater falls, and the seawater facing away from the moon falls. Case 3: If the moon's dark matter vortex has a large radius and wraps around the earth, the seawater near the moon's side is compressed by the rotation of the moon's vortex toward the core of the vortex where the moon is located. At this time, there will be an ebb phenomenon. The seawater facing away from the moon will also rise due to the centripetal force of the vortex where the earth is located. At this point, a low tide occurs on the side of earth facing away from the moon. Thus, the degree to which the moon's vortex merges with earth's vortex determines whether the sea level rises or falls, which can be confirmed by measuring sea depths. It is certain that the moon is blocked by the high expansion zone outside earth's gravitational layer. If the compressive force of earth's vortex is large enough and the moon's vortex continues to approach earth, the moon could be pushed out of its own dark matter vortex by the high expansion region outside earth's gravitational layer. In this case, the moon, without the compression of the vortex, enters the expansion compression zone of the vortex where the earth is located, forming the planetary ring, which is the same situation as a star entering a black hole. The sun at the center of the vortex is mainly composed of hydrogen and helium. And helium is produced by hydrogen fusion, which is lighter than the elements of the surrounding planets. Since the density of heavy elements dark matter is large, and the expansion force of dark matter outside the vortex is large, they will not be compressed into the center of the vortex. However, the hydrogen element can enter the center of the solar system vortex and becomes a component of the sun because it has small mass, the density of dark matter is small and the expansion force of dark matter outside the vortex is small. A circular aircraft can be designed according to the principle of quantum entanglement. The aircraft will have its own dark matter vortex. The expansion of dark matter outside the vortex is controlled by increasing or slowing down the vortex rotation speed, so as to realize the lifting and suspension of the aircraft. A circle of small vortex can be set around the aircraft to control the local dark matter expansion on the side of the aircraft to adjust the lateral flight direction. A two-way rotating field needs to be added in the core of the vortex, which requires multi-directionality. It controls nuclear fusion by compressing the core, providing energy for flight. In the gravitational layer region, after the aircraft's vortex accelerates its spin, the absence of obstacles above the vortex means that the expansion of dark matter above the aircraft exerts minimal downward thrust. Meanwhile, due to the expansion of dark matter between the aircraft's vortex and the ground, the upward thrust from the expansion of dark matter outside the aircraft's vortex exceeds the downward pressure from the expansion of dark matter above the aircraft. As a result, the aircraft rises. As the aircraft approaches the high expansion zone outside the gravitational layer, it can either accelerate its vortex spin in advance and then reduce the spin to use inertia to cross the boundary, or it can accelerate the spin to breach the boundary directly. In the expansion-compression zone, the density of dark matter is low in the direction towards the gravitational layer, resulting in a large thrust from expansion. Conversely, in the direction away from the gravitational layer, the density of dark matter is high, resulting in a smaller thrust from expansion. After accelerating, the vortex of the aircraft moves towards the direction with higher dark matter density, which means moving away from the core celestial body of the vortex. Magnetic levitation relies on the repulsive principle of vortices rotating in the same direction, which differs from the principle used here. In the case of the aircraft, its vortex involves the superposition of two magnetic fields with opposite rotational directions (Ciri, Bettoni & Galletta). Additionally, one vortex rotates faster while the other rotates slower, and their rotational speed difference cannot be too large. The height and speed of the aircraft's levitation are directly proportional to the spin speed of the vortices.

② **Universe**

As the material at the center of a galaxy accumulates and grows, the rotational compression speed increases, leading to a faster rate of expansion in the galaxy's internal expansion-compression zone. Additionally, the expansion rate of dark matter outside the galaxy will also increase as the rotational speed of the galaxy's vortex accelerates. When a black hole forms at the center of a galaxy, and the vortex core of a star approaches the high expansion zone outside the black hole's gravitational layer (7), the star's vortex continues to move closer to the black hole's vortex core under the compression exerted by the black hole's vortex. As the star's vortex approaches the high expansion zone outside the black hole, the expansion force outside the atomic vortices of the star becomes extremely strong. Additionally, the high expansion zone outside the black hole's gravitational layer further prevents the star from entering the black hole. Consequently, the star is trapped outside the high expansion zone of the black hole's gravitational layer. Under the ongoing compression of the black hole's vortex, the star's vortex is pushed out of its own vortex core. Without this vortex compression, the star's atoms remain outside the high expansion zone of the black hole, accumulating and forming a ring. Due to the high expansion of the zone outside the black hole's gravitational layer, the nuclei of hydrogen atoms in the star are expelled under vortex compression. This process continues until the atoms can be compressed into the black hole by the dark matter vortex. After the star is expelled from its vortex, the dark matter vortex of the star will vanish as it changes with the dark matter vortex field of the black hole. The photon ring at the edge of the black hole (Johnson et al., 2020) is formed because the high expansion zone outside the black hole's gravitational layer slows the entry of photons into the black hole, causing them to accumulate. The rotation of galaxies affects the rotation of dark matter throughout the universe, which can lead to the formation of a universal vortex. And matter enters the core to form a central black hole. As the central matter increases, the vortex rotates faster. The higher the rotation speed of the universe, the greater the compression force inside the vortex and the expansion force. The distribution of galaxies in all directions of the universe is not completely uniform. An equatorial plane and central axis will be formed in the direction of many galaxies. The central axis of the cosmic vortex expands after being compressed, which causes galaxies within the universe to move closer to the equatorial plane while expanding. At the same time, the expansion at the poles of the rotation axis generates a downward compressive force, leading to slower expansion of galaxies at the poles compared to those near the equator. This results in the universe tending towards a flattened shape. However, the dark matter vortex of the entire universe remains spherical. As matter accumulates at the center of the cosmic vortex and the rotation speed increases, the density along the rotation axis decreases. Eventually, all galaxies will move towards the equatorial plane of the cosmic vortex and be compressed into the central black hole of the universe.

③ **Atom**

The atomic vortex has the same structure as the celestial vortex. The hydrogen atom is a vortex, and so is the electron. The atomic nucleus is at the center of the vortex, and the electrons rotate with the vortex around the rotation axis. The center of the vortex is the gravitational layer of the nucleus, and the outer side of the gravitational layer is the expansion compression zone, where the electrons are inside and are driven by the dark matter to rotate around the rotation axis of the vortex. The outer part of the gravitational layer of the atomic nucleus is a high expansion compression zone and electrons rotate around the rotation axis. Therefore, in general, electrons will not be compressed into the atomic nucleus by dark matter, unless the vortex where the atom is located has very high rotation speed, or the electron rotation speed is reduced. The expansion force outside the vortex of the electron must decrease in order for the electron to pass through the high expansion zone outside the atomic nucleus and be compressed into the nucleus. Since dark matter has a double-helix structure and exhibits quantum entanglement, the entanglement of particles within the atomic nucleus includes both upward and downward rotations (Dehollain, J. et al.), which can also be described as left-rotating and right-rotating. Similarly, electrons outside the nucleus also exhibit left-rotating and right-rotating rotations around their vortex. Due to the light mass of electrons, even minor external disturbances can significantly increase their spin speed, causing substantial fluctuations in the expansion force outside the electron's vortex and resulting in instability of the electron's orbit. We can create a spherical vortex, and by controlling the rotation speed of the vortex, nuclear fusion can be controlled. Unlike this (Ongena, J.，et al. 2016), the vortex must be controlled by a bidirectional rotating magnetic field with different left and right rotation speed. And the speed difference between the two should not be too large. The compression force is increased by accelerating the vortex rotation speed. Since the core of the vortex formed is expanded, nuclear fusion will be difficult to occur. A bidirectional rotational field is needed to add in the core of the vortex. The core's bidirectional rotational field requires multidirectional rotation to compress the vortex core's dark matter, forming a gravitational layer. Increasing the rotation speed amplifies the rotational force, causing collisions between atoms with differing rotational directions and leading to compression and nuclear fusion. When the rotation speed of the external dark matter is less than the rotation speed of the atom, and the rotation speed of the dark matter vortex where the atom is located is reduced due to the effect of the external dark matter. The nucleus at the center of the vortex is reduced by the squeezing force. The repulsive force between particles inside the nucleus will be greater than the compression force of the dark matter vortex, and the internal particles will be ejected by the repulsive force between the particles. This is what we call nuclear decay. The neutrons move at high speed to form turbulent vortex when neutrons bombard atomic nuclei at high speed. The expansion between two vortices rotating in opposite directions causes the splitting of atomic vortices. Vortexes with opposite direction of rotation will be generated during the motion process of neutron, which is the reason for nuclear fission.

(II) Time and speed

① **Time**

Time is positively correlated with the density of dark matter in the gravitational field and the rotation speed. The faster the rotation speed and the greater the density, the higher the resulting pressure, and the slower time becomes. Thus, time is equivalent to the pressure generated by the rotation of dark matter. In the absence of matter and dark matter, there is no space and no time. When an object moves faster, part of the impact force will be converted into rotation force, which will accelerate the speed of the vortex where the moving object is located. The volume of the core gravitational layer shrinks as the vortex spin speed increases, which can be understood as the gravitational layer space becoming smaller (Chou et al. 2010). The effect of linear motion on the speed of time and the contraction of space is far less obvious than the effect of direct acceleration of vortex rotation. Since there is an expansion zone outside the vortex, when the object moves forward at a high speed, the external dark matter will expand, which will form a resistance to the vortex where the moving object is located, so that the front end of the vortex is compressed (Ota et al. 2022). The spinning speed of moving particles can be properly reduced, which can reduce the external expansion force of the vortex, thereby reducing the resistance to linear motion. Pressure can also be applied to compress the expansion zone outside the vortex to reduce resistance.

② **Speed**

The quantum entanglement of dark matter is simultaneous, regardless of speed, distance or time. The compression of the gravitational layer and the expansion of the expansion compression zone also occur simultaneously, regardless of speed, distance or the speed of light. The speed of light only indicates the velocity of electromagnetic waves traveling through dark matter. When all matter is compressed into the core of the entire cosmic vortex, the core's matter will drag and compress the dark matter outside the gravitational layer into the gravitational layer, forming a mass of dark matter. Consequently, the vortex disappears. At this time, dark matter and matter together are like a single atomic nucleus. Without the rotation and compression forces of the dark matter vortex, dark matter rises suddenly between particles, causing the particles to repel and separate from each other, which can also be called an explosion. If matter needs to completely separate and explode, it must be in a space without any matter and dark matter. With a certain mass of dark matter, matter rotates at high speed in the form of a vortex until the largest dark matter vortex vanishes after being compressed by the core matter. Only in this way can matter completely explode. Why must it go with dark matter? Matter cannot gather together without the vortex of dark matter. If there is no expansion force among vortexes, there will be no impact force. Without matter spin, dark matter also cannot be compressed into a singularity.

(III) Explanation of the phenomena observed in the experiment

① **Gravitational lensing**

When images of galaxies from the side or rear pass through the external expansion zone of a galaxy, the light from nearby galaxies or celestial objects will be bent and magnified due to the expansion of space, resulting in an Einstein ring. As light passes near a massive vortex, it follows a curved path due to the rotation of dark matter, converging in front of the galaxy to form an image of the galaxy (Chiao 2008).

② **Parity violation**

The dark matter vortex is formed under the impact force, and they rotate left and right, like the mushroom cloud formed by an atomic bomb explosion. If galaxies rotate right, the compression force is larger when the dark matter vortex rotates right, and if galaxies rotate left, the compression force is larger when the dark matter vortex rotates left. Professor Wu Jianxiong's cobalt 60 experiment showed that: when the cobalt-60 atomic vortex rotates to the left and right, more particles produced by decay rotate to the left, which shows that the compression force of the right rotating is greater than that of the left rotating and the rotation is symmetrical. Due to the quantum entanglement between the particles that make up an atom (Dehollain et al. 2016; Dada et al. 2011), there is symmetry in the number of particles rotating right up and down. When the cobalt-60 atom rotates right up, the particles in the nucleus rotate 180° from right to left. At this time, the particles in the nucleus rotate right down. The atomic vortex rotates right. Under this compression force, the particle vortex rotates left. On the contrary, when the atomic vortex rotates left, the particle vortex rotates right under the compression force. At this time, the expansion zone outside the right-rotating part of the particle vortex is subject to the compression force caused by the atomic vortex greater than that of the right-up-rotating part. The expansion force outside the right-rotating particle vortex increases. The ejection force of the right-down-rotating part increases, and the particle ejects the nucleus downward, or the particle is ejected in the left-rotating form. When the particles in the nucleus changes from rotating right down to rotating right up, the right-rotating particle in the nucleus is compressed by the right-rotating atomic vortex, and the left-rotating particle is compressed by the left-rotating atomic vortex. At this time, the compression force caused when particles in the nucleus rotate right up increases, and the expansion force outside the particle vortex decreases. Thus, when the particle changes from rotating right down to rotating right up, the ejection force is reduced, and it is difficult for the particle to eject atoms (Wu et al. 1957; Lee&Yang.1956). Thus, the parity violation is caused by the inconsistent compression force when the dark matter vortex rotates left and right. The compression force is inconsistent because the vortex is formed by the impact force. Left rotation and right rotation cannot be called parity symmetry. They can only be regarded as directions changed by rotating 180 degrees. Parity symmetry in the true sense is that particles ejected when atomic vortexes with a right-rotating compression force greater than a left-rotating one and a left-rotating compression force greater than a right-rotating one decay will be symmetric. Under the effect of the symmetry of left and right rotation quantity presented by the quantum entanglement between the particles in the vortex, the repulsion between the particles in the vortex is reduced. Only when the compression force of the left-rotating part is always smaller than that of the right-rotating part, the vortex rotation can be stable.

③ Annihilation

When the particle with a right-rotating compression force greater than the left-rotating one and the particle with a left-rotting compression force greater than the right-rotating one collide and are compressed to form a vortex, the left-rotating and right-rotating compression forces of the combined vortex increase. It is as if two particles are hit by two directions at the same time, and the merged vortex disappears quickly and annihilates. The right-rotating vortex and left-rotating particles are not in the same vortex, but are vortex particles generated in two different rotating galaxies, that is, positive and negative particles. When the smallest positive and negative particles in the universe enter each other's galaxy, their rotational speed will decay, and their left and right rotating speed will be changed, thus becoming antiparticles. For example, after a particle with a greater right-rotating speed than the left-rotating speed enters the vortex of dark matter with a greater left-rotating speed than the right-rotating speed, it will become a particle with a greater left-rotating speed than the right-rotating speed. Even after the smallest fundamental particles collide and annihilate, they still remain connected to each other (Zheng et al. 2022).

④ Chemical reaction

Chemical reactions involve accelerating the rotational speed of atomic vortices through various methods. This increases the expansion force outside the atomic vortices, enhancing the repulsive forces between atoms, which leads to their separation. Once the rotational speed of the atomic vortices decreases, the atoms recombine to form molecules, a low-speed phenomenon. Chemical bonds are formed when the compressive force of the gravitational layer causes the vortices of several atoms to partially overlap. Due to the expansion of dark matter outside the overlapping region, the rotation speed of dark matter within the overlapping area is lower than outside it. Electrons will not be pushed out by dark matter rotation when they enter the overlapping zone. Thus, atoms do not separate when the compression force of external dark matter is small. When the spin speed of atomic vortex increases, the expansion force of the dark matter outside the vortices also increases, leading to a greater repulsive force between atoms. When the repulsive force reaches a certain level, the overlapping zone between atoms is separated. At the same time, electrons in the overlapping region are dragged into their respective vortexes.

⑤ **Quantum tunneling effect**

As the rotation speed of the particle vortex increases, the expansion force outside the particle vortex increases. Thus, particles escape from the potential barrier, or the compression force of the vortex is smaller than the overall repulsion force of the internal particles. In this case, a quantum tunneling effect occurs. For example, when the total repulsive force between particles in the nucleus is greater than the compression force of the dark matter vortex, the particles in the nucleus escape from the center of the vortex. By accelerating the spin of dark matter in cold metals, the dark matter speeds up the electron vortices within the metal. As the spin of the electron vortices accelerates, the expansion force of the dark matter outside the vortices increases, enabling electrons to escape from the metal's surface. This is called the cold electron emission (Paulsen et al. 2019; Wallraff et al. 2003).

⑥ **Electromagnetic interaction**

The circular motion of electrons drives the rotation of dark matter to form an electric field of vortex with unidirectional helix. The magnetic field is about the rotation of dark matter driven by the spin of matter, and it is a vortex field formed by core rotation. The magnetic field of the dark matter vortex also drives electron spin. Two magnetic fields rotating in the same direction repel each other, and two magnetic fields rotating in opposite directions attract each other. An elementary particle is structurally a double helix, so the rotating dark matter driven by it also has a double-helix structure. Only magnetic fields rotating in opposite directions can be compressed into a double-helix vortex by the external dark matter vortex field.

⑦ **Double-slit interference experiment**

Since the dark matter vortex is structurally a double helix and dark matter has quantum entanglement, dark matter expands due to the rotation compression of the vortex without observing the path when particles arrive at the screen through the double slits. This expansion state is a slit, which is split into left and right rotations. The split left-rotating parts and right-rotating parts are split into left-rotating and right-rotating parts respectively. In this way, after the left and right slits overlap, the particle proportion on the screen is shown as follows:

…	1/32 Right		1/16 Left		1/8 Right		1/4 Left/		1/4 Right		1/8 Left		1/16 Right		1/32 Left		1/64 Right	…
…	1/64 Left		1/32 Right		1/16 Left		1/8 Right		1/4 Left		1/4 Right		1/8 Left		1/16 Right		1/32 Left	…
					b		a				a'		b'					
								Left		Right slit								

								slit										

The blue represents left slit, and the red represents right slit. The particles are not waves, but vortexes. The left and right structures expand after the dark matter in the gravitational layer is compressed by rotation, and the particles move with the expansion of dark matter. That is to say, no matter how many slits, they are all caused by the expansion of these two slits. The figure above shows a phenomenon in which the two slits expand, become misaligned and overlap, forming a central slit with a ratio of 1/2 on the screen. The delayed choice experiment sees that two slits appear separately on the two screens. In this case, the two peaks in the middle are both 1/4 when the path screen is not observed. When people observe the particle path with an instrument, dark matter entangles with the human consciousness, and the path returns to its eigenstate. When people do not observe the particle's path, the dark matter in the gravitational layer, affected by material compression, remains in an expanded state. The left and right expansion of dark matter is to offset the pulling force caused when the vortex rotates left and right to keep the dark matter vortex stable. Otherwise, the entire universe can be compressed into a small vortex even if a single particle continuously rotates and pulls. Only when matter enters the vortex can the center of the vortex increase its compressive force. This is true of every vortex of dark matter. The distance between the double slits after expansion is proportional to the rotation speed of the vortex field and the mass of materials at the core of the vortex. In other words, the greater the mass of the matter in the gravitational field, the faster the rotation speed, the higher the density of the dark matter in the gravitational field and the greater the expansion distance between the left-rotating and right-rotating parts of the dark matter. When the screen is split by the left and right slits and the path is not observed, the distance between waves will increase. (Harada et al. 2018)

⑧ Similarities and differences with general relativity and quantum mechanics

General relativity describes a smooth spacetime structure. In contrast, the theory described here is based on turbulence and incorporates quantum entanglement. In this model, general relativity is only relevant to the gravitational layer, and it constitutes a very small part of the overall theory. Relativity describes spacetime curvature as a result of the compression of space by matter, but it does not specify the mechanism of this compression. Quantum mechanics describes quantum entanglement as a particle behavior but does not explain the purpose behind this behavior. The description of wave-particle duality also differs. The theory described here focuses on changes in the gravitational field rather than on particle behavior. In contrast, the Standard Model describes particles with distinct roles and interactions to explain fields. In the theory presented, there is only one type of particle that simultaneously rotates both left and right, without functional differentiation.

⑨ Theoretical predictions

1 After the formation of dark matter vortices, the expansion of the rotational axis will cause matter to move away from the axis. The expansion of the vortex core will push core matter further from the core itself, with the core's expansion zone being more transparent than the vortex's edge before hydrogen atoms accumulate. The core matter initially moves away and then gathers. As the rotational axis expands further, the transparent region will widen, and matter will continue to move away rather than gather.

2 After the formation of dark matter vortices, even before matter accumulates in the core, the material within the vortex rotates around the axis in both leftward and rightward directions, indicating that the vortex exhibits bidirectional rotation.

3 This paper mentions measurements of seawater depth.

Conclusion: Dark matter

If there is no dark matter, the black hole vortex formed at the end of the universe cannot explode no matter how long it rotates and how much it distorts the space. In the endless space, the vortex always exists, so does the compression force on the core. Dark matter and matter are limited. When dark matter is rotated and squeezed to a singularity by core matter, the vortex and the compression force on the core disappear, allowing dark matter between particles to skyrocket. Therefore, dark matter exists, and space is not distorted by matter. However, the universe outside the dark matter vortex where we live cannot be observed with electromagnetic waves, because they can only propagate in dark matter. If there is another universe outside the universe vortex we are in, even if there is a distance of one millimeter between the two, the electromagnetic waves of one side cannot touch the other. Maybe only after we really figure out the quantum entanglement of dark matter can we know what is going on outside the vortex universe we are in.

Disclosure

A preprint has previously been published (22)

Data availability

Data sharing was not applicable to this article as no datasets were generated or analyzed during the current study.

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Ethics declarations

Conflict of interest

The author declare that he have no conflict of interest.