Shedding Light on Dark Matter

The XENON1T Experiment hopes to finally detect and prove the existence of dark matter particles with the help of much, much more sensitive equipment. [17]

Dark matter has never been seen directly, but scientists know that something massive is out there due to its gravitational effects on visible matter. One explanation for how such a large amount of mass appears to be right in front of our eyes yet completely invisible by conventional means is that the dark matter is hiding in the centers of stars. [16]

Scientists have detected a mysterious X-ray signal that could be caused by dark matter streaming out of our Sun's core. Preliminary evidence of solar axions in XMM-Newton observations has quite recently been published by Fraser et al. These authors also estimate the axion mass to be $m = 2.3 * 10^{-6}$ eV. Since an axion with this mass behaves as a cold dark matter particle, the considered preliminary detection directly concerns cold dark matter as well. So, it would be a revolutionary discovery if confirmed. Unfortunately, we have identified three distinct flaws in the analysis by Fraser et al. which ultimately make it totally irrelevant both for axions and for cold dark matter. [15]

Hidden photons are predicted in some extensions of the Standard Model of particle physics, and unlike WIMPs they would interact electromagnetically with normal matter.

In particle physics and astrophysics, weakly interacting massive particles, or WIMPs, are among the leading hypothetical particle physics candidates for dark matter.

The gravitational force attracting the matter, causing concentration of the matter in a small space and leaving much space with low matter concentration: dark matter and energy.

There is an asymmetry between the mass of the electric charges, for example proton and electron, can understood by the asymmetrical Planck Distribution Law. This temperature dependent energy distribution is asymmetric around the maximum intensity, where the annihilation of matter and antimatter is a high probability event. The asymmetric sides are creating different frequencies of electromagnetic radiations being in the same intensity level and compensating each other. One of these compensating ratios is the electron – proton mass ratio. The lower energy side has no compensating intensity level, it is the dark energy and the corresponding matter is the dark matter.

Contents

Author: George Rajna

The Big Bang

The Big Bang caused acceleration created radial currents of the matter, and since the matter is composed of negative and positive charges, these currents are creating magnetic field and attracting forces between the parallel moving electric currents. This is the gravitational force experienced by the matter, and also the mass is result of the electromagnetic forces between the charged particles. The positive and negative charged currents attracts each other or by the magnetic forces or by the much stronger electrostatic forces!?
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There is an asymmetry between the mass of the electric charges, for example proton and electron, can understood by the asymmetrical Planck Distribution Law. This temperature dependent energy distribution is asymmetric around the maximum intensity, where the annihilation of matter and antimatter is a high probability event. The asymmetric sides are creating different frequencies of electromagnetic radiations being in the same intensity level and compensating each other. One of these compensating ratios is the electron – proton mass ratio. The lower energy side has no compensating intensity level, it is the dark energy and the corresponding matter is the dark matter.

Shedding Light on Dark Matter: Israeli, European and Arab Scientists Team Up

What is dark matter? We don't know, for all that physicists think there's about five times more of it than "normal" matter, which is mostly the atoms we all know and love. Now a new international collaboration in which European, Israeli, American and Arab scientists are taking part, XENON1T, is starting in the hope of tracking down and proving the existence of the mysterious beast.

“Until now, evidence for dark matter – the matter thought to make up most of the mass in the Universe – has only been obtained indirectly, via inconsistencies in the gravitational interactions governing the dynamics of the cosmos," says Dr. Ranny Budnik, head of the Weizmann Institute team that is participating in the experiment, from the Gran Sasso Underground Laboratory in Italy.

In other words, we don't actually know that dark matter exists. But the matter that we can detect cannot explain the empiric measurements. There is something else out there. Dark matter is a theory that could explain cosmic anomalies such as why the "gravitational mass" and the "luminous mass" of galaxies and clusters of galaxies are grossly mismatched.

Physicists suspect that dark matter, whatever it is, makes up most of the universe, but consists of a sort of stable elementary particle that has escaped detection so far. The XENON1T experiment, which was inagurated on Wednesday, will be searching for this mystery matter that we can't see, at what the scientists claim is a whole new level of sensitivity.

Why have the dark particles escaped detection so far? Their interaction with ordinary matter is apparently very weak, Budnik explains. It may be too weak for humankind to have detected so far, with the technology at hand, or maybe its mass is too small. With the new experiment at the underground lab in Italy, they should be able to detect interactions far weaker than before, he postulates.

Been around 13 billion years

Why do we postulate that this dark matter is a stable particle? Because unstable ones decay, transforming into smaller particles; and the amount of dark matter in the early stages of the universe and today is the same, so it couldn't be some sort of particle that decays, Budnik explains to Haaretz. The universe is some 13 billion years old, he points out. Ergo the dark matter particle is stable, or at least lives much longer than that. (The material we're made of is also stable, by and large, Budnik adds.)

XENON1T

The XENON1T, which scientists hope will be able to detect dark matter particles, from its protected location 1,400 meters underground. Courtesy of the Weizmann Institute

A whole new level of sensitivity is needed for the search because existing technologies have utterly failed to detect dark matter particles – though its existence can be inferred from its gravitational effects on "normal" matter and on radiation.

Physicists estimate that about 100,000 dark matter particles pass through an area the size of a thumbnail each second, Budnik says. “The fact that we have not detected them yet tells us that the likelihood of them interacting with the atoms of our detector is very small, and that we need extremely sensitive instruments in order to find the rare signature of such a particle," he explains.

In the hope of seeing interactions of a dark matter particle, the team needed an instrument with a large mass and an extremely low radioactive background and stuck it 1,400 meters underground, to protect the array from pesky cosmic rays.

“If we are to have any chance of seeing rare interactions of a dark matter particle, we need an instrument with a large mass and an extremely low radioactive background,” says Budnik. XENON1T has photosensors so sensitive they can detect the flash of light from a single photon, as well as single electrons liberated in an interaction, he says.

The XENON Collaboration comprises 20 research groups from Germany, Italy, Switzerland, Portugal, France, the Netherlands, Sweden, Israel, the U.S., and Abu Dhabi. [17]

Dark matter hiding in stars may cause observable oscillations

In a new study, physicists have investigated the possibility that large amounts of hidden mass inside stars might be composed of extremely lightweight hypothetical particles called axions, which are a primary dark matter candidate. The scientists, Richard Brito at the University of Lisbon in Portugal; Vitor Cardoso at the University of Lisbon and the Perimeter Institute for Theoretical Physics in Waterloo, Ontario, Canada; and Hirotada Okawa at Kyoto University and Waseda University, both in Japan, have published their paper on dark matter in stars in a recent issue of Physical Review Letters.

"Our work studies how dark matter piles up inside stars if the dark matter is composed of massive bosonic particles (axions are an example of such particles)," Brito told Phys.org. "Our results show that dark matter accretion by stars does not lead to gravitational collapse; instead it may give rise to characteristic vibrations in stars."

The researchers theoretically showed that, if numerous axions were to pile up inside normal stars, then the dark matter core would oscillate. The oscillating core would in turn cause the star's fluid to oscillate in tune with it at a specific frequency related to the star's mass, or at multiples of this frequency. For a typical axion mass, the oscillating stars would emit microwave radiation and might have observable effects.

"What oscillates is the fluid density and its pressure, but it's probably correct as well to say that the entire star is oscillating," Brito explained. "These are like sound waves propagating through the fluid, with a very specific frequency. Oscillations of this kind could, for example, lead to variations in the luminosity or in the temperature of the star, and these are quantities that we can measure directly.

"In fact, there is already a whole branch of physics called asteroseismology, which studies the internal structure of stars by observing their oscillation modes. This is very much like the way scientists study the internal structure of the Earth by looking at seismic waves. It is possible that the oscillations of a star driven by a dark matter core could also be observed using similar methods. Given the very specific frequencies at which these stars would vibrate, this could be a smoking gun for the presence of dark matter. Asteroseismology is still in its infancy but it will, almost certainly, become a very precise way of observing stars in the future."

In previous research on dark matter stars, it has often been assumed that stars accreting dark matter will continue to grow until they become so dense that they collapse into black holes. However, in the new study the physicists' simulations showed that these stars actually appear to be stable and do not become black holes.

Their stability arises from a self-regulatory mechanism called "gravitational cooling" in which the stars eject mass to slow down and stop their growth before they approach the critical Chandrasekhar limit, the point at which they collapse into black holes.

As the scientists explain, the finding that dark matter stars are stable makes a surprising contribution to the research in this area.

"Although it was known for some time that dark matter can be accreted by stars and form dark matter cores at their center, those studies were all phenomenological," Brito said. "In addition, basically all these studies suggested that, if enough dark matter is accreted by a star, it will eventually trigger gravitational collapse and a black hole would form, eventually eating all the star.

"We set about checking these claims, using a rigorous fully relativistic framework, i.e., solving the full Einstein's equations. This is important if we want to understand how the dark matter core behaves for large densities. Well, it turns out that our results show that black hole formation can, in principle, be avoided by ejecting excessive mass: the dark matter core starts 'repelling' itself when it is too massive and compact, and is unable to grow past a certain threshold. This is, as far as we know, something that was ignored in previous works.

"The above results are quite generic. Because any self-gravitating massive bosonic field can form compact structures, any such putative dark matter component would lead to the kind of effects we discuss in our paper. In this sense it proposes another way to search for these kinds of particles that can be complementary to observations coming from cosmology, for example. Given the lack of information that we have about the nature of dark matter, we think that it might be worth the effort to further develop this subject."

The scientists hope that the results here may help guide future research by suggesting where to look for dark matter and what methods to use to detect it.

"We don't know much about dark matter," Brito said. "The only thing we do know is that all kinds of matter (be it regular matter or dark, invisible matter) fall in the same way in gravitational fields. This is Einstein's equivalence principle in action. Thus, dark matter also falls in the usual way. It seems therefore appropriate to look for effects of dark matter in regions where gravity is strong, like neutron stars, black holes, etc. We are now trying to understand how dark matter behaves generically in regions of strong gravity.

"At this precise moment, we are working on a long version of this letter. We want to understand in depth how the dark matter core grows for different kind of scenarios, and how viscosity in the star's material affects the development of the accretion process." [16]

Astronomers may have detected the first direct evidence of dark matter

Scientists have detected a mysterious X-ray signal that could be caused by dark matter streaming out of our Sun's core.

Now scientists at the University of Leicester have identified a signal on the X-ray spectrum which appears to be a signature of 'axions' - a hypothetical dark matter particle that's never been detected before.

While we can't get too excited just yet - it will take years to confirm whether this signal really is dark matter - the discovery would completely change our understanding of how the Universe works. After all, dark matter is the force that holds our galaxies together, so learning more about it is pretty important.

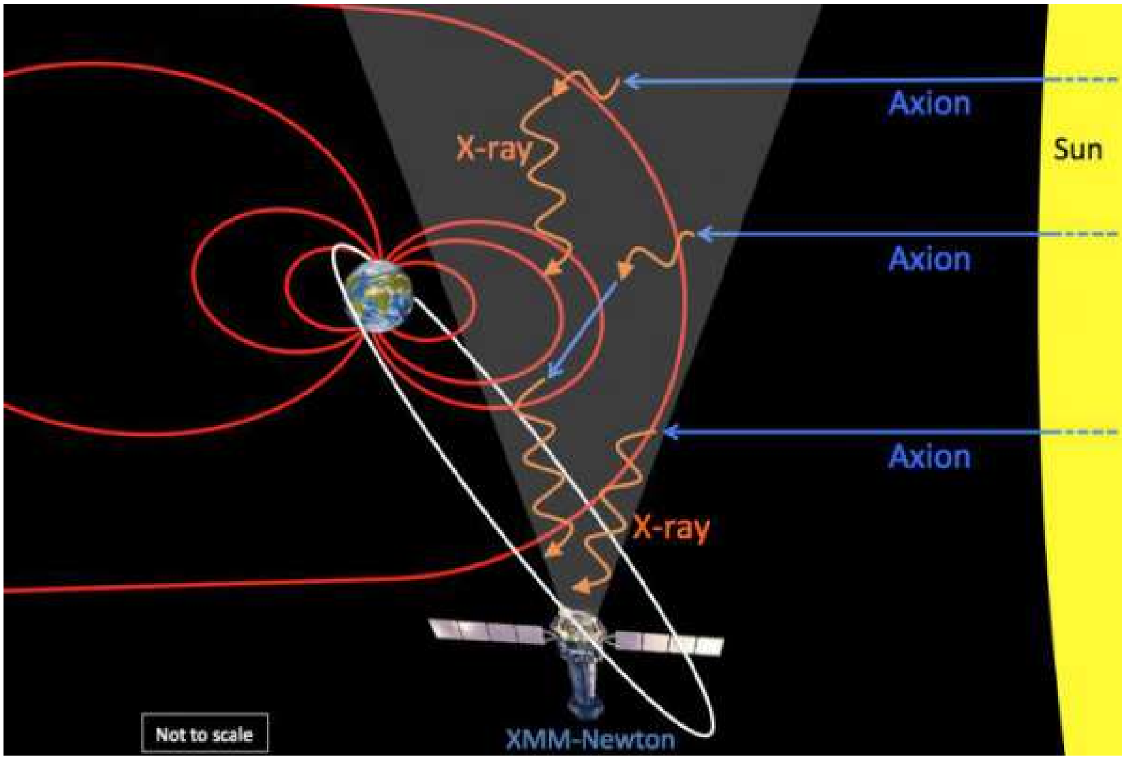
The researchers first detected the signal while searching through 15 years of measurements taking by the European Space Agency's orbiting XMM-Newton space observatory.

Unexpectedly, they noticed that the intensity of X-rays recorded by the spacecraft rose by about 10% whenever XMM-Newton was at the boundary of Earth's magnetic field facing the Sun - even once they removed all the bright X-ray sources from the sky. Usually, that X-ray background is stable.

"The X-ray background - the sky, after the bright X-ray sources are removed - appears to be unchanged whenever you look at it," said Andy Read, from the University of Leicester, one of the lead authors on the paper, in a press release. "However, we have discovered a seasonal signal in this X-ray background, which has no conventional explanation, but is consistent with the discovery of axions."

Researchers predict that axions, if they exist, would be produced invisibly by the Sun, but would convert to X-rays as they hit Earth's magnetic field. This X-ray signal should in theory be strongest when looking through the sunward side of the magnetic field, as this is where the Earth's magnetic field is strongest.

The next step is for the researchers to get a larger dataset from XMM-Newton and confirm the pattern they've seen in X-rays. Once they've done that, they can begin the long process of proving that they have, in fact, detecting dark matter streaming out of our Sun's core.



A sketch (not to scale) shows axions (blue) streaming out of the Sun and then converting into X-rays (orange) in the Earth's magnetic field (red). The X-rays are then detected by the XMM-Newton observatory. [13]

The axion is a hypothetical elementary particle postulated by the Peccei–Quinn theory in 1977 to resolve the strong CP problem in quantum chromodynamics (QCD). If axions exist and have low mass within a specific range, they are of interest as a possible component of cold dark matter. [14]

No axions from the Sun

Preliminary evidence of solar axions in XMM-Newton observations has quite recently been published by Fraser et al. These authors also estimate the axion mass to be $m = 2.3 * 10^{-6}$ eV. Since an axion with this mass behaves as a cold dark matter particle, the considered preliminary detection directly concerns cold dark matter as well. So, it would be a revolutionary discovery if confirmed. Unfortunately, we have identified three distinct flaws in the analysis by Fraser et al. which ultimately make it totally irrelevant both for axions and for cold dark matter. [15]

Hidden photons

Hidden photons are predicted in some extensions of the Standard Model of particle physics, and unlike WIMPs they would interact electromagnetically with normal matter. Hidden photons also have a very small mass, and are expected to oscillate into normal photons in a process similar to neutrino oscillation. Observing such oscillations relies on detectors that are sensitive to extremely small electromagnetic signals, and a number of these extremely difficult experiments have been built or proposed.

A spherical mirror is ideal for detecting such light because the emitted photons would be concentrated at the sphere's centre, whereas any background light bouncing off the mirror would pass through a focus midway between the sphere's surface and centre. A receiver placed at the centre could then pick up the dark-matter-generated photons, if tuned to their frequency – which is related to the mass of the incoming hidden photons – with mirror and receiver shielded as much as possible from stray electromagnetic waves.

Ideal mirror at hand

Fortunately for the team, an ideal mirror is at hand: a 13 m2 aluminium mirror used in tests during the construction of the Pierre Auger Observatory and located at the Karlsruhe Institute of Technology. Döbrich and co-workers have got together with several researchers from Karlsruhe, and the collaboration is now readying the mirror by adjusting the position of each of its 36 segments to minimize the spot size of the focused waves. They are also measuring background radiation within the shielded room that will house the experiment. As for receivers, the most likely initial option is a set of low-noise photomultiplier tubes for measurements of visible light, which corresponds to hidden-photon masses of about 1 eV/C^2. Another obvious choice is a receiver for gigahertz radiation, which corresponds to masses less than 0.001 eV/C^2; however, this latter set-up would require more shielding.

Dark matter composition research - WIMP

The WIMP (Weakly interactive massive particles) form a class of heavy particles, interacting slightly with matter, and constitute excellent candidates with the nonbaryonic dark matter. The neutralino postulated by the supersymetric extensions of the standard model of particle physics. The idea of supersymmetry is to associate each boson to a fermion and vice versa. Each particle is then given a super-partner, having identical properties (mass, load), but with a spin which differes by 1/2. Thus, the number of particles is doubled. For example, the photon is accompanied by a photino, the graviton by a gravitino, the electron of a selectron, etc. Following the impossibility to detect a 511 keV boson (the electron partner), the physicists had to re-examine the idea of an exact symmetry. Symmetry is 'broken' and superpartners have a very important mass. One of these superparticules called LSP (Lightest Supersymmetric Particle) is the lightest of all. In most of the supersymmetric theories (without violation of the R-parity) the LSP is a stable particle because it cannot disintegrate in a lighter element. It is of neutral color and electric charge and is then only sensitive to weak interaction (weak nuclear force). It is then an excellent candidate for the not-baryonic dark matter. [11]

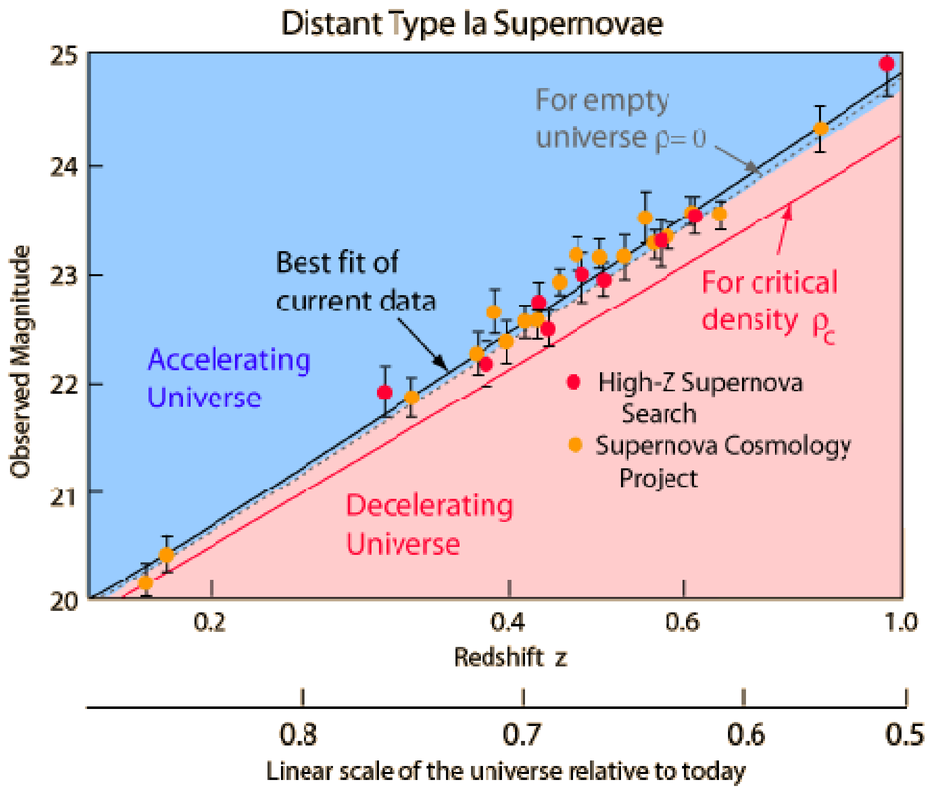
Weakly interacting massive particles

In particle physics and astrophysics, weakly interacting massive particles, or WIMPs, are among the leading hypothetical particle physics candidates for dark matter. The term "WIMP" is given to a dark matter particle that was produced by falling out of thermal equilibrium with the hot dense plasma of the early universe, although it is often used to refer to any dark matter candidate that interacts with standard particles via a force similar in strength to the weak nuclear force. Its name comes from the fact that obtaining the correct abundance of dark matter today via thermal production requires a self-annihilation cross section, which is roughly what is expected for a new particle in the 100 GeV mass range that interacts via the electroweak force. This apparent coincidence is known as the "WIMP miracle". Because supersymmetric extensions of the standard model of particle physics readily predict a new particle with these properties, a stable supersymmetric partner has long been a prime WIMP candidate. However, recent null results from direct detection experiments including LUX and SuperCDMS, along with the failure to produce evidence of supersymmetry in the Large Hadron Collider (LHC) experiment has cast doubt on the simplest WIMP hypothesis. Experimental efforts to detect WIMPs include the search for products of WIMP annihilation, including gamma rays, neutrinos and cosmic rays in nearby galaxies and galaxy clusters; direct detection experiments designed to measure the collision of WIMPs with nuclei in the laboratory, as well as attempts to directly produce WIMPs in colliders such as the LHC. [10]

Evidence for an accelerating universe

One of the observational foundations for the big bang model of cosmology was the observed expansion of the universe. [9] Measurement of the expansion rate is a critical part of the study, and it has been found that the expansion rate is very nearly "flat". That is, the universe is very close to the critical density, above which it would slow down and collapse inward toward a future "big crunch". One of the great challenges of astronomy and astrophysics is distance measurement over the vast distances of the universe. Since the 1990s it has become apparent that type Ia supernovae offer a unique opportunity for the consistent measurement of distance out to perhaps 1000 Mpc. Measurement at these great distances provided the first data to suggest that the expansion rate of the universe is actually accelerating. That acceleration implies an energy density that acts in opposition to gravity which would cause the expansion to accelerate. This is an energy density which we have not directly detected observationally and it has been given the name "dark energy".

The type Ia supernova evidence for an accelerated universe has been discussed by Perlmutter and the diagram below follows his illustration in Physics Today.



The data summarized in the illustration above involve the measurement of the redshifts of the distant supernovae. The observed magnitudes are plotted against the redshift parameter z. Note that there are a number of Type 1a supernovae around z=.6, which with a Hubble constant of 71 km/s/mpc is a distance of about 5 billion light years.

Equation

The cosmological constant Λ appears in Einstein's field equation [5] in the form of

$$R_{\mu\nu} - \frac{1}{2}R\,g_{\mu\nu} + \Lambda\,g_{\mu\nu} = \frac{8\pi G}{c^4}T_{\mu\nu}\,,$$

where *R* and *g* describe the structure of spacetime, *T* pertains to matter and energy affecting that structure, and *G* and *c* are conversion factors that arise from using traditional units of measurement. When Λ is zero, this reduces to the original field equation of general relativity. When *T* is zero, the field equation describes empty space (the vacuum).

The cosmological constant has the same effect as an intrinsic energy density of the vacuum, ρ_{vac} (and an associated pressure). In this context it is commonly moved onto the right-hand side of the equation, and defined with a proportionality factor of 8π: $\Lambda = 8\pi\rho_{vac}$, where unit conventions of general relativity are used (otherwise factors of *G* and *c* would also appear). It is common to quote values of energy density directly, though still using the name "cosmological constant".

A positive vacuum energy density resulting from a cosmological constant implies a negative pressure, and vice versa. If the energy density is positive, the associated negative pressure will drive an accelerated expansion of the universe, as observed. (See dark energy and cosmic inflation for details.)

Explanatory models

Models attempting to explain accelerating expansion include some form of dark energy, dark fluid or phantom energy. The most important property of dark energy is that it has negative pressure which is distributed relatively homogeneously in space. The simplest explanation for dark energy is that it is a cosmological constant or vacuum energy; this leads to the Lambda-CDM model, which is generally known as the Standard Model of Cosmology as of 2003-2013, since it is the simplest model in good agreement with a variety of recent observations.

Dark Matter and Energy

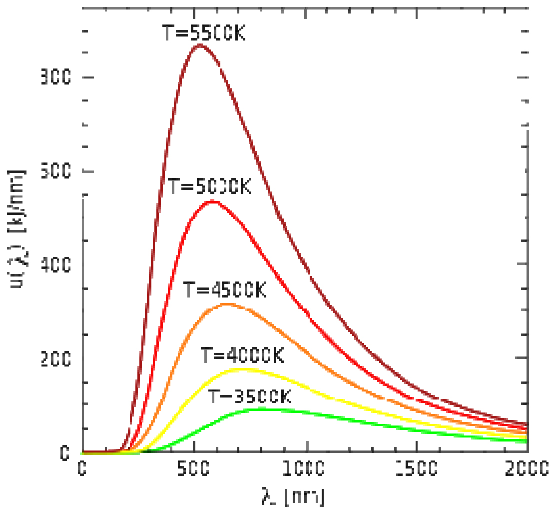
Dark matter is a type of matter hypothesized in astronomy and cosmology to account for a large part of the mass that appears to be missing from the universe. Dark matter cannot be seen directly with telescopes; evidently it neither emits nor absorbs light or other electromagnetic radiation at any significant level. It is otherwise hypothesized to simply be matter that is not reactant to light. Instead, the existence and properties of dark matter are inferred from its gravitational effects on visible matter, radiation, and the large-scale structure of the universe. According to the Planck mission team, and based on the standard model of cosmology, the total mass–energy of the known universe contains 4.9% ordinary matter, 26.8% dark matter and 68.3% dark energy. Thus, dark matter is estimated to constitute 84.5% of the total matter in the universe, while dark energy plus dark matter constitute 95.1% of the total content of the universe. [6]

Cosmic microwave background

The cosmic microwave background (CMB) is the thermal radiation assumed to be left over from the "Big Bang" of cosmology. When the universe cooled enough, protons and electrons combined to form neutral atoms. These atoms could no longer absorb the thermal radiation, and so the universe became transparent instead of being an opaque fog. [7]

Thermal radiation

Thermal radiation is electromagnetic radiation generated by the thermal motion of charged particles in matter. All matter with a temperature greater than absolute zero emits thermal radiation. When the temperature of the body is greater than absolute zero, interatomic collisions cause the kinetic energy of the atoms or molecules to change. This results in charge-acceleration and/or dipole oscillation which produces electromagnetic radiation, and the wide spectrum of radiation reflects the wide spectrum of energies and accelerations that occur even at a single temperature. [8]



Electromagnetic Field and Quantum Theory

Needless to say that the accelerating electrons of the steady stationary current are a simple demystification of the magnetic field, by creating a decreasing charge distribution along the wire, maintaining the decreasing U potential and creating the **A** vector potential experienced by the electrons moving by **v** velocity relative to the wire. This way it is easier to understand also the time dependent changes of the electric current and the electromagnetic waves as the resulting fields moving by c velocity.
It could be possible something very important law of the nature behind the self maintaining **E** accelerating force by the accelerated electrons. The accelerated electrons created electromagnetic fields are so natural that they occur as electromagnetic waves traveling with velocity c. It shows that the electric charges are the result of the electromagnetic waves diffraction.
One of the most important conclusions is that the electric charges are moving in an accelerated way and even if their velocity is constant, they have an intrinsic acceleration anyway, the so called spin, since they need at least an intrinsic acceleration to make possible they movement .
The bridge between the classical and quantum theory is based on this intrinsic acceleration of the spin, explaining also the Heisenberg Uncertainty Principle. The particle – wave duality of the electric charges and the photon makes certain that they are both sides of the same thing. Basing the gravitational force on the accelerating Universe caused magnetic force and the Planck Distribution Law of the electromagnetic waves caused diffraction gives us the basis to build a Unified Theory of the physical interactions. [4]

Lorentz transformation of the Special Relativity

In the referential frame of the accelerating electrons the charge density lowering linearly because of the linearly growing way they takes every next time period. From the referential frame of the wire there is a parabolic charge density lowering.

The difference between these two referential frames, namely the referential frame of the wire and the referential frame of the moving electrons gives the relativistic effect. Important to say that the moving electrons presenting the time coordinate, since the electrons are taking linearly increasing way every next time period, and the wire presenting the geometric coordinate. The Lorentz transformations are based on moving light sources of the Michelson - Morley experiment giving a practical method to transform time and geometric coordinates without explaining the source of this mystery.

The real mystery is that the accelerating charges are maintaining the accelerating force with their charge distribution locally. The resolution of this mystery that the charges are simply the results of the diffraction patterns, that is the charges and the electric field are two sides of the same thing. Otherwise the charges could exceed the velocity of the electromagnetic field.

The increasing mass of the electric charges the result of the increasing inductive electric force acting against the accelerating force. The decreasing mass of the decreasing acceleration is the result of the inductive electric force acting against the decreasing force. This is the relativistic mass change explanation, especially importantly explaining the mass reduction in case of velocity decrease.

The Classical Relativistic effect

The moving charges are self maintain the electromagnetic field locally, causing their movement and this is the result of their acceleration under the force of this field.
In the classical physics the charges will distributed along the electric current so that the electric potential lowering along the current, by linearly increasing the way they take every next time period because this accelerated motion.

Electromagnetic inertia and Gravitational attraction

Since the magnetic induction creates a negative electric field as a result of the changing acceleration, it works as an electromagnetic inertia, causing an electromagnetic mass.

It looks clear that the growing acceleration results the relativistic growing mass - limited also with the velocity of the electromagnetic wave.

Since $E = h\nu$ and $E = mc^2$, $m = h\nu / c^2$ that is the m depends only on the ν frequency. It means that the mass of the proton and electron are electromagnetic and the result of the electromagnetic induction, caused by the changing acceleration of the spinning and moving charge! It could be that the m_o inertial mass is the result of the spin, since this is the only accelerating motion of the electric charge. Since the accelerating motion has different frequency for the electron in the atom and the proton, they masses are different, also as the wavelengths on both sides of the diffraction pattern, giving equal intensity of radiation.

If the mass is electromagnetic, then the gravitation is also electromagnetic effect caused by the accelerating Universe! The same charges would attract each other if they are moving parallel by the magnetic effect.

The Planck distribution law explains the different frequencies of the proton and electron, giving equal intensity to different lambda wavelengths! Also since the particles are diffraction patterns they have some closeness to each other – can be seen as a gravitational force.

Electromagnetic inertia and mass

Electromagnetic Induction

Since the magnetic induction creates a negative electric field as a result of the changing acceleration, it works as an electromagnetic inertia, causing an electromagnetic mass. [1]

Relativistic change of mass

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The frequency dependence of mass

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Electron – Proton mass rate

The Planck distribution law explains the different frequencies of the proton and electron, giving equal intensity to different lambda wavelengths! Also since the particles are diffraction patterns they have some closeness to each other – can be seen as a gravitational force. [1]

There is an asymmetry between the mass of the electric charges, for example proton and electron, can understood by the asymmetrical Planck Distribution Law. This temperature dependent energy distribution is asymmetric around the maximum intensity, where the annihilation of matter and antimatter is a high probability event. The asymmetric sides are creating different frequencies of electromagnetic radiations being in the same intensity level and compensating each other. One of these compensating ratios is the electron – proton mass ratio. The lower energy side has no compensating intensity level, it is the dark energy and the corresponding matter is the dark matter.

Gravity from the point of view of quantum physics

The Gravitational force

The gravitational attractive force is basically a magnetic force.

The same electric charges can attract one another by the magnetic force if they are moving parallel in the same direction. Since the electrically neutral matter is composed of negative and positive charges they need 2 photons to mediate this attractive force, one per charges. The Bing Bang caused parallel moving of the matter gives this magnetic force, experienced as gravitational force.

Since graviton is a tensor field, it has spin = 2, could be 2 photons with spin = 1 together.

You can think about photons as virtual electron – positron pairs, obtaining the necessary virtual mass for gravity.

The mass as seen before a result of the diffraction, for example the proton – electron mass rate Mp=1840 Me. In order to move one of these diffraction maximum (electron or proton) we need to intervene into the diffraction pattern with a force appropriate to the intensity of this diffraction maximum, means its intensity or mass.

The Big Bang caused acceleration created radial currents of the matter, and since the matter is composed of negative and positive charges, these currents are creating magnetic field and attracting forces between the parallel moving electric currents. This is the gravitational force experienced by the matter, and also the mass is result of the electromagnetic forces between the charged particles. The positive and negative charged currents attracts each other or by the magnetic forces or by the much stronger electrostatic forces!?

The Graviton

In physics, the graviton is a hypothetical elementary particle that mediates the force of gravitation in the framework of quantum field theory. If it exists, the graviton is expected to be massless (because the gravitational force appears to have unlimited range) and must be a spin-2 boson. The spin follows from the fact that the source of gravitation is the stress-energy tensor, a second-rank tensor (compared to electromagnetism's spin-1 photon, the source of which is the four-current, a first-rank tensor). Additionally, it can be shown that any massless spin-2 field would give rise to a force indistinguishable from gravitation, because a massless spin-2 field must couple to (interact with) the stress-energy tensor in the same way that the gravitational field does. This result suggests that, if a massless spin-2 particle is discovered, it must be the graviton, so that the only experimental verification needed for the graviton may simply be the discovery of a massless spin-2 particle. [2]

Conclusions

Researchers predict that axions, if they exist, would be produced invisibly by the Sun, but would convert to X-rays as they hit Earth's magnetic field. This X-ray signal should in theory be strongest when looking through the sunward side of the magnetic field, as this is where the Earth's magnetic field is strongest. The high frequency of the X-ray and the uncompensated Planck distribution makes the axion a good candidate to be dark matter.
Unfortunately, we have identified three distinct flaws in the analysis by Fraser et al. which ultimately make it totally irrelevant both for axions and for cold dark matter. [15]
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The gravitational force attracting the matter, causing concentration of the matter in a small space and leaving much space with low matter concentration: dark matter and energy.
There is an asymmetry between the mass of the electric charges, for example proton and electron, can understood by the asymmetrical Planck Distribution Law. This temperature dependent energy distribution is asymmetric around the maximum intensity, where the annihilation of matter and antimatter is a high probability event. The asymmetric sides are creating different frequencies of electromagnetic radiations being in the same intensity level and compensating each other. One of

these compensating ratios is the electron – proton mass ratio. The lower energy side has no compensating intensity level, it is the dark energy and the corresponding matter is the dark matter. The electric currents causing self maintaining electric potential is the source of the special and general relativistic effects. The Higgs Field is the result of the electromagnetic induction. The Graviton is two photons together. [3]

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