Title –

ARE THE EXTREME FIELDS OF MAGNETARS DUE TO GRAVITATIONAL WAVES AND PHOTON DECOUPLING

Author – Rodney Bartlett

Abstract –
In our Milky Way galaxy's Westerlund 1 star cluster, there's a magnetar - neutron star with an extremely strong magnetic field - whose progenitor was a star about 40 times the mass of the Sun. This behemoth should have collapsed to form a black hole, not a magnetar. The answer to this puzzle seems to lie with a companion star called Westerlund 1-5 that is now escaping the cluster. Mass was transferred from the magnetar progenitor to Westerlund 1-5, allowing its companion to shrink to a size that allowed a magnetar to be born instead of a black hole. (A study published in the May 2014 issue of "Astronomy & Astrophysics")

The following preserves the necessity of a binary star system; going into detail which proposes why a magnetar, not a black hole, was born - and suggesting an answer as to why the magnetic field is so extreme.

Content –

Gravitation Forms Matter, Dark Energy and Electromagnetism

The result begins with this sentence - "the more mass a body possesses, the more gravitation is diverted to play a part in that body's formation". Agreeing with Einstein's theory that gravitation is a push created by the hills and valleys of curved space, gravitational waves are a repelling force (this aspect of gravity is normally referred to as Dark Energy) refracted towards the Sun's centre. The waves ultimately originate far out in deep space where they push galaxy clusters apart. As they pass the solar system's outer boundary, some waves are refracted by the Sun's mass like ocean waves passing an island (some are refracted towards the island and cause waves on its beaches).

Having given the planets pushes which keep them in their orbits and prevent them flying off into space (gravitational waves from the opposite direction stop planets spiralling into the Sun), the waves arrive at the Sun where they interact with electromagnetism to form the masses of subatomic particles (mass being produced by G-EM interaction was proposed by Einstein in a 1919 paper to the Prussian Academy of Sciences - "Do Gravitational Fields Play An Essential Part In The Structure Of The Elementary Particles Of Matter?").* They also form the strong and weak nuclear forces associated with those particles (nuclear forces are a by-product of G-EM interaction).^ The rotating Sun bulges at its equator and therefore has a larger equatorial than polar diameter, and more mass at its

equator. This means more gravitation has been diverted to that region. Planets are also made from G and EM interacting #, and must consequently lie in the path gravity waves took from the outer solar system to the solar equator (more gravitation was diverted here - so if planets are created by G and EM, it follows that they'd be created where the gravitational "current" is greatest). For simplicity, we say the Sun's gravitation is strongest at its equator and planets are compelled to orbit in the ecliptic plane.

* The 2012 article "How Einstein Discovered Dark Energy" by Alex Harvey (http://arxiv.org/pdf/1211.6338v1.pdf) states, "Recall that in 1918 the only elementary particles known were the electron and the proton. Physicists were attempting to understand why these were stable despite their internal electromagnetic repulsion. Most attempts were based solely on electromagnetic theory. For a review of these efforts see W. Pauli, *Theory of Relativity*, Pergamon Press, London (1958). See Part V, p.184 *ff*]. Einstein's effort was to construct a model in which stability was achieved through the use of gravitational forces. In particular, he used modified gravitational field equations which included the cosmological constant [A. Einstein, "Speilen Gravitationfelder in Aufbau der Elementarteilchen eine Wesentliche Rolle" (Do gravitational fields play an essential role in the structure of elementary particles), Sitzungsberichte der Preussischen Akademie der Wissenschaften, (Math. Phys.), 349-356 (1919) Berlin]. The attempt was not successful and this was the last time he mentioned the cosmological constant other than to denounce it."
(Though Einstein's effort to construct a model in which stability was achieved through the use of gravitational forces was not regarded as successful, success may be achieved nearly a century later when his model is adapted to the Westerlund 1 magnetar.)

^ When Einstein penned E=mc^2, he used c (c^2) to convert between energy units and mass units. The conversion number is 90,000,000,000 (light's velocity of 300,000 km/s x 300,000 km/s) which approx. equals 10^11. After gravity forms matter, successive gravity waves are, via gravitational lensing, concentrated 10^24 times (to 10^25, weak nuclear force's strength, giving the illusion that a weak nuclear force exists without being a product of gravitation). Then they're further magnified by the matter's density to achieve electromagnetism's strength (10^36 times gravity's strength) i.e. 10^25 is multiplied by Einstein's conversion factor [10^11] and gives 10^36 (this gives the illusion of electric and magnetic fields that are not a product of gravitation existing). Successive gravity waves are absorbed by the matter and radiated as longer-wavelength waves (both as electromagnetic waves - possibly gamma rays, or **a microwave background** – and as gravitational waves which have lost 10^24 of their energy or strength (and are labelled "10^1".)

Newtonian and Relativistic Gravity

Matter would, in this case, be the concentrated form of gravitational waves. There's a stronger gravitational force on the surface of, and within, the Earth

because gravity is concentrated in the matter there. So, like in a black hole, time is slowed down (by much less and at lower altitudes, in the case of Earth). The high velocities experienced by orbiting astronauts also slows time at their extreme altitudes. The article "Gravitation" by Robert F. Paton - The World Book Encyclopedia (Field Enterprises Educational Corporation, 1967) – states, "… when one object is inside another, gravitation decreases the closer their centers are to each other" and also states that Isaac Newton's 1687 Law of Gravitation explains why an object at the center of the earth would weigh nothing [1]. Objects in space or an orbiting spaceship are similarly free from the earth's (or any planet's or star's) concentrated gravity/mass which is below, instead of above, them and makes them relatively weightless. Gravity's repulsive [2] force (which propagates from all directions) is UNconcentrated and, as Penguin Encyclopedia tells us, FAR less than Earth gravity. The concentrated gravity forming the spaceship is insignificant compared to the gravity forming a planet or star, and causes no noticeable reduction of weightlessness.

[1] The interpretation in this article says the concentrated gravity, which we call mass, above the object pushes equally on it from every direction and renders it weightless since it isn't attracted to any portion of the overlying mass.

[2] Einstein showed that attraction of two bodies of matter actually results from space-time's curvature pushing bodies.

Electromagnetism and Decoupling

An electromagnetic wave consists of a varying electric field and a varying magnetic field, at right angles to each other. Suppose Westerlund 1's magnetar happens to have its magnetic field aligned with the plane of the gravitational waves being diverted to Westerlund 1-5, its stellar companion. Then the gravitational waves would compress the magnetic waves and give the magnetar an extremely powerful magnetic field. Since the stellar companion is now escaping the cluster, it takes with it mass from the magnetar and mass's cause (gravitation) as well as gravitation's product (electromagnetism). Concentrated magnetism remains, being compressed and forming a powerful field. Therefore, the electromagnetism carried away by the companion should primarily consist of an electric field. This could result from the electric fields in the electromagnetic waves occupying that region of space-time not being aligned with the gravitational waves travelling to Westerlund 1-5's equator and centre. More gravitation is diverted to the equatorial region. So the electric fields wouldn't be compressed by that gravitation but would only encounter the weaker gravitation occurring perpendicular to the magnetic field. This gives the electric component greater freedom to escape, and to possibly leave the system with the Westerlund 1-5 companion star.

Photons are the basic constituents of the electromagnetic wave, and of the perpendicular electric field / magnetic field. In the Westerlund 1 magnetar, there's a certain amount of photon decoupling because the electric and magnetic components of electromagnetism possess separate destinies. The wave can be visualized as a stream of photons which can be split into two groups, each going its own way. But remember this – the appearance of a stream of photons can be duplicated using a single photon. If it's presented in position A, then B, then C, and so on; it can deceive an observer or detector into believing it's either in motion or is a number of particles streaming through space and time. It's accepted in physics that a single photon can actually interfere with itself. Does this mean it's not indivisible but can decouple from itself and separate into a part that, for example, can be a compressed magnetic field and another part that can be an escaping electric field transported by a star? How could this happen?

Digital String Theory and Black Holes

Let's borrow a few ideas from string theory's ideas of everything being ultimately composed of tiny, one-dimensional strings that vibrate as clockwise, standing, and counterclockwise currents in a four-dimensional looped superstring .We can visualize tiny, one dimensional binary digits of 1 and 0 (base 2 mathematics) forming currents in a two-dimensional program called a Mobius loop – or in 2 Mobius loops, clockwise currents in one loop combining with counterclockwise currents in the other to form a standing current. Combination of the 2 loops' currents requires connection of the two as a four-dimensional Klein bottle. This connection can be made with the infinitely-long irrational and transcendental numbers. Such an infinite connection translates - via bosons being ultimately composed of the binary digits of 1 and 0 depicting pi, e, √2 etc.; and fermions being given mass by bosons interacting in matter particles' "wave packets" – into an infinite number of (possibly Figure-8) Klein bottles which are, in fact, "subuniverses" (binary digits fill in gaps and adjust edges of our 13.8-billion-year-old subuniverse to fit surrounding subuniverses [similar to manipulation of images by computers]). Slight "imperfections" in the way the Mobius loops fit together determine the precise nature of the **binary-digit currents (the producers of space-time, gravitational waves, electromagnetic waves, the nuclear strong force and the nuclear weak force)** and thus of exact mass, charge, quantum spin. They would also produce black holes* - whose binary digits could, in the case of the sun, come from our star being compressed to 2.95 kms, in which case the pressure increase "shreds" the sun into its binary digits (its mass is relativistically converted into the energy of binary digits). Referring to a BEC (Bose-Einstein condensate), the slightest change in the binary-digit flow (Mobius loop orientation) would alter the way gravitation and electromagnetism interact, and the BEC could become a gas (experiments confirm that it does).

* Black holes may be thought of as meeting-places and "sinks" for the gravitational currents flowing in and between galaxies. Though they aren't composed of matter, they do have mass because they are "gravity sinks" and

gravity is capable of producing matter and mass. In black holes, the mass falling into them is relativistically converted into the energy of binary digits i.e. the bosons stop interacting in wave packets to produce the forces we identify as mass, and the bosons – which are ultimately composed of the binary digits depicting pi, e, √2 etc. (see "Digital String Theory") – register as 1's and 0's. They possess charge because the universe's mathematical foundation unites gravity/spacetime with electricity/magnetism (see the paragraph about Digital String Theory). Since it has mass, a black hole can naturally possess the 3rd property of holes viz. spin. Far from the hole becoming infinitely dense and infinitely massive, there is no singularity but the matter is "shred" into binary digits by the black hole's fantastic pressure.
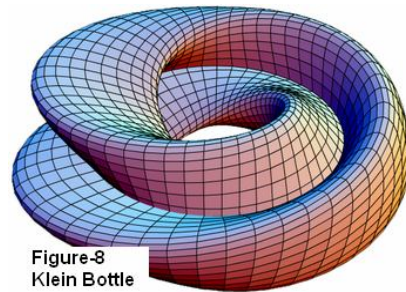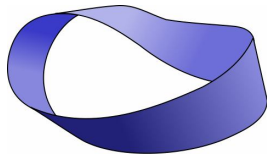
Mobius Loop

Figure-8
Klein Bottle