

Title - **ABOUT A SUPERNOVA FORMING DUST**

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Abstract –

This was inspired by a Letter to the journal Nature. The letter's "Rapid formation of large dust grains in the luminous supernova 2010jl" by Christa Gall, Jens Hjorth, Darach Watson, Eli Dwek, Justyn R. Maund, Ori Fox, Giorgos Leloudas, Daniele Malesani & Avril C. Day-Jones. It was published online on July 9, 2014

(<http://www.nature.com/nature/journal/vaop/ncurrent/full/nature13558.html>)

My slightly alternative view about dust produced by a supernova includes topics such as $E=mc^2$, black holes, dark energy, and deletion of the big bang/inflation.

Content -

EXPLANATORY INTRO TO DUST FORMATION

It's possible that the gravitons of gravitational waves and photons of electromagnetic waves could be ultimately composed of the binary digits of 1 and 0 encoding π , e , $\sqrt{2}$ etc (because the cosmos seems to be fundamentally mathematical). Matter particles (and even bosons like the Higgs, W and Z particles) could receive their mass by gravitons/photons interacting in "wave packets" (explaining wave-particle duality). The above explanation of superposition - everything having the same origin of binary digits, and being able to affect each other like the 1's and 0's forming a computer image - could even help unravel cosmology's Big Bang theory. The universe would not be unified to near-uniform temperature and curvature by the whole cosmos having once been small enough for everything to be in contact, then undergoing extremely rapid expansion from a big bang during a period called inflation. It would be quantum entangled (unified) by everything having the same origin of binary digits (they therefore affect each other like the 1's and 0's forming a computer image).

E=MC²

I think $E=mc^2$ supports this idea of photons and gravitons interacting –

Representing the masslessness of photons by 0 (zero) and replacing the m (mass in Einstein's famous equation relating energy, mass and the speed of light) with the masslessness results in $E=0*c^2$ i.e. $E=0$. Having reduced the equation to E, $m=0$ and $c^2=0$ which means $m=c^2$. At first glance, $m=c^2$ seems to be saying mass exists at light speed. But the absence of E refers to

there being no interaction of light energy and gravitational energy, and therefore no mass. From Einstein's formula, $c^2=E/m$ and (using $m=c^2$) $c^2=E/c^2$ which means $E=c^4$. If graviton/photon interaction produces mass (both particles are equally vital), E (mass-energy of particle) = c^2 (light's photon) multiplied by c^2 (gravity's graviton) ($c^2*c^2=c^4$). Since E also equals 0, c^2*c^2 is the masslessness of the photon times the masslessness of the graviton.

The speed of light is c and c^2 refers to observers and light co-moving. So the other c^2 refers to observers and gravity co-moving. The speed of gravitational waves is c and the speed of light is equal to the speed of gravity. Of course, this ignores quantum entanglement – this implies that if the sun suddenly stopped shining or having a gravitational influence, those effects would be detectable instantly. The “pairing up” of bits (binary digits) i.e. of the electronic binary digits of 1 and 0 in the largest and the smallest scales, means this: quantum effects are not distinct from macroscopic events, and become apparent on a large (even astronomical) scale. This permits a “distant” event to instantly affect another (exemplified experimentally by the quantum entanglement of particles separated by light years – but also hypothetically possible for galaxies and humans). Pairing up also permits effects to influence seemingly separate causes on subatomic, galactic and human etc scales (the first steps to proving this can be seen in the retrocausality or backward causality promoted by Israeli physicist Yakir Aharonov and others).

c^2 and the Atom

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} . Gravity (and gravitation) can produce electromagnetic force, though there are other methods. An example of another method: X-rays can be emitted by matter swirling around a black hole when the atoms jostle and compress, and are heated to millions of degrees. Gravity waves with a strength of 10^1 are, via gravitational lensing, concentrated 10^{24} times after they're focused to form matter (to 10^{25} , weak nuclear force's strength* - giving the illusion that a weak nuclear force that is not the product of gravitation exists). (If binary digits form space-time and gravitation, and all particles are composed of those digits, the sequence of 1's and 0's composing gravitons can become the sequence making up the W^+ , W^- and Z^0 particles of the weak force; the gluons of the nuclear strong force; or of electromagnetism's photons.) Waves are 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 the existence of electric and magnetic fields that are not a product of gravitation – last century, Einstein stated that gravitation and electromagnetism are

related). After absorption by atoms, the depleted remnant of the gravity waves is re-radiated from stars, interstellar gas and dust, etc. as electromagnetic waves - possibly gamma rays, or a microwave background - and as gravitational waves which have lost most of their energy or strength during formation of forces (returning to a strength of "10¹".)

* Remember, this is only one example: the so-called weak force's "strength isn't constant" and varies with distances [1].

Gravitational Radiation

The Sun (and other bodies) can also radiate gravitational waves, according to the above paragraph. 99% of the solar system's mass/gravity/gravitational waves are associated with our star, so the gravitational push on Earth from its sphere may be slightly greater than the push resulting from the waves originating in deep space. Though the expanse of space opposite the Sun from Earth's viewpoint is tremendously larger, it's also tremendously less dense and the waves from any solar-size region are far less numerous. Because of the great number of solar-size areas, the strength of the gravitational waves affecting Earth could still be almost as great as the effect of our star's gravity waves. In the end, our planet's orbit would be growing slowly larger. According to [2]; the distance between Sun and Earth is growing by approx. 15 centimetres per century. The two authors attribute this increase of the Astronomical Unit to dark energy.

DUST FORMATION (WITH BLACK HOLES AND DARK ENERGY)

A supernova blows off some material before exploding and this forms a slower moving, cooler shell. Travelling at light speed, gravitational and electromagnetic radiation (consisting of binary digits) from the blast slams into that material. The lower temperature allows the energy of the gravitons to interact with that of the photons, producing mass in the form of dust i.e. dust particles condense in the shell. In the same way, waves from deep space can produce graviton-photon interaction, forming collapsing clouds of dust and gas from which stars form. If there's no interaction as a result of higher temperatures, no matter is created and there is no cloud of gas and dust. A black hole – formed of gravitational waves and their precursors, binary digits (see 1st sentence) - could be the result (supernovas can produce black holes, too).

Gravitational waves radiating from a supernova to its surrounding shell would push against the shell and be repulsive. Similarly, waves originating from warps far out in space and condensing into interstellar clouds would be repelling gravitational waves that might conceivably account for universal expansion (the 1's and 0's forming the waves would be candidates for explaining dark energy).

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. The holes possess charge because the universe’s mathematical foundation unites gravity/spacetime with electricity/magnetism. Since it has mass, a black hole can naturally possess the 3rd property of holes viz. spin. Far from the hole becoming infinitely dense, infinitely curved and infinitely massive; there is no singularity but the matter is “shred” (converted relativistically) into binary digits by the black hole’s fantastic pressure.

REFERENCES

[1] “The Strengths of the Known Forces” by theoretical physicist Matt Strassler [May 31, 2013] - <http://profmattstrassler.com/articles-and-posts/particle-physics-basics/the-known-forces-of-nature/the-strength-of-the-known-forces/>

[2] “Secular Increase of Astronomical Unit from Analysis of the Major Planet Motions, and Its Interpretation” in "Celestial Mechanics & Dynamical Astronomy", Volume 90, Issue 3-4, 2004, pp. 267-288 by Krasinsky, G.A. and Brumberg, V.A.