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Uranium and other actinids as source for star cores, powered by a dual fission-fusion reactor. Ternary fission processes as source for fusion fuel in stars. A suggestion on the origins of the Big Bang

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Abstract : Recent astrophysical discoveries, including actinid-rich stars and protostars close to a black hole, as well as geophysical research (for instance the proximity of zirconium and barytine mines, stable decay products of major fission products, to volcanic areas), allow to confirm, rearrange and expand the hypothesis first developed by J M Herndon in the 1990s by adapting it fully to star cores and linking it to volcanism. This article offers a contradiction of the R-process and of the chondritic model for the Earth's composition: it claims that U and Th chains are not synthesized in supernovas, but at the origin of stars and planetary cores. It offers a link between nuclear fission and fusion through ternary fission processes, claims that supernovas are the main factor for super volcanic eruptions and suggests that neutrons expelled by supernovas, accelerated by the disappearance of attraction forces, constitute accelerated matter explaining gravitational waves. Actinids, or perhaps a single atom as heavy as the Universe, may be the origin of the Big Bang phenomenon.

The « actinid boost » is a long-time issue which can be resolved. Some stars have been confirmed to be uranium and thorium-rich. This is confirmed by spectral research, see for instance Hill et al (2017) as well as Barbuy et al (2011). Both teams found U and Th – rich stars and used the classical theory to assess that these stars are very old. They may on the contrary be extremely recent agglomerates of matter. Three arguments.

1. Type 1A supernovas are evidence : the passing of a big star close to a very small one mean that the small one will receive much more neutrons as well as hydrogen captured by gravity than it is accustomed to in its internal nuclear equilibrium ; thus it reacts extremely violently, and goes hypercritical. The bright light of Type 1A supernovas confirms that dwarf stars are mostly made of U & Th (as well as of the Bi209 from the Np237 chain), failed to light up and thus did not accumulate the much needed hydrogen moderator and fusion fuel. The amount of unfissioned U and Th explains extremely well the brightness of these supernovas which are highly dominated by fission whereas other supernovas are more equilibrated between fission and fusion (as the internal U and Th core collides with the outer sphere at detonation, compressing it and fusing it). It also appears that supernovas close to Earth like the one giving birth to Barnard's Loop are linked to supervolcanoes, in this case the Huckleberry Ridge Tuff and Cerro Galan supervolcanos. Neutrons from the Lagoon Nebula may also be linked. It may be possible to envision a better datation by linking Lagoon Nebula initial blast to Barnard's, which could have happened closer to each other than thought until now, and a method for predicting supervolcanoes from supernovas. The high temperature of stars around SN1987A even more suggests that the dramatic event provided neutrons to the fission core of these stars. The sudden relapse of gravity when a star explodes could act as a propulsive power for its own fission and fusion neutrons, which may gain speed up to close to the

speed of light. All the VEI 6 volcanic eruptions in the 20th Century can be linked to supernovas which happened close to Earth in recent times : G1.9+0.3 happened approximatively in 1898 according to recent research and this event can be linked to the Santa Maria (VEI 6) and Montagne Pelée (VEI 4, yet very deadly) eruptions of 1902 as well as the beginning of the activity of Novarupta (1912, VEI 6¹) and of the Cerro Azul (1903, which led to a VEI 6 eruption in 1932 after a succession of volcanic events). SN 1987A may be linked to the Pinatubo eruption of 1991 (VEI 6) as well as Rabaul (1990 - 1995) and Unzen volcanos (1991). For the Samalas supervolcano in 1257 (see Lavigne et al (2013) as well as Oppenheimer (2003)), SN1006 could be the ideal explanation (in which the magma would have accumulated during a longer period than usual, leading to a bigger eruption than in the VEI 6 cases discussed above). This lengthy accumulation could be linked to the succession of SN1054 and SN1181 after SN1006, each caused by the former because of neutrons from a first supernova triggering another hypercriticality, and each spewing more neutrons onto Earth, increasing the amount of nuclear fissions and forming a growing magmatic chamber until the 1257 super-eruption (there were certainly more eruptions of a more limited intensity before). It actually makes sense that light may be refracted and slowed down for instance in the Milky Way because of clouds of refractive materials with no similar effect on fast neutrons so that neutrons come *earlier*, hence linking Type 1a SN1006 with the Mount Baekdu supervolcano in 946 (where the magnitude of a Type 1A supernova explains the magnitude and quickness of development of the event). SN 1604 may be linked to a lengthy accumulation of magma leading to the Mount Tambora supereruption (with the supplementary contribution of Cas A), and can even be linked locally to events such as the small volcanic eruptions that actually took place in the granitic – uranium-rich Mercantour massif, recorded in 1612 after the disappearance of an entire village into a crater of “flames” (a plaque still commemorates the event in the Cians with the inscription “Hic omnes disparuerunt recquiesant in pace – 1612”) and another lava flow recorded at the same time (again in the Cians in the Raton mountain near the Dôme du Barrot) – see Rossi (2017). SN1604 also coincides with highly destructive eruptions in the Mediterranean area (Vesuvius 1631, Kolumbo (Santorini area) 1650 and Etna 1669)

R. J. De Meijer and W. van Westrenen 2008 note that « *The KamLAND collaboration presented the first evidence for geoneutrinos (antineutrinos produced within the Earth) in July 2005. Development of direction-sensitive antineutrino detectors should provide a means for a critical test of our hypothesis. The first step in the development of this type of detector has recently been completed with success. Measurements with an array of these detectors could reveal whether elevated concentrations of U and Th are present in the CMB, and if so, could identify the process by which heat is produced.* ». G. V. Domogatsky et al (2004) also note a possible antineutrino confirmation of fission in the Earth’s core. G.J. MacDonald (1988) also notes findings of dihydrogen gas in the Kola borehole in Russian territory. Last point, the findings that zirconium and barytine mines are concentrated near old extinct volcanoes or hydrothermal areas are a good confirmation that these elements are the stable decay products of nuclear fissions underground. This is also shown by the explosive nature of “tornillos” associated with magma production in subduction areas that can easily be compared to the typical signal of underground nuclear tests. These element can allow us to reconstitute a planetary and stellar motor for temporary increases of fission and fusion, where the fuel for fusion is provided by ternary fission processes, explaining the accumulation of dihydrogen as well as other light elements close to the Earth’s surface. The discovery that barytine and zirconium mines are located close to old volcanoes confirms that nuclear fission is the motor for magmatic formation and explains the contribution of water to explosive increases of magma in subduction magmatic chambers, as water brought by subduction is the perfect incident neutron moderator for nuclear fission supercriticalities propped up sometimes by the impact of neutrons from nuclear supercriticalities in stars. It suggests a direct link between novas,

1 « However, there are also abundant data for magma interactions leading to disequilibrium assemblages over a range of time scales leading up to the 1912 eruption. » Hammer et al (2002)

supernovas and volcanism. This is also confirmed by the high intensity of the antineutrino flux in KamLAND, close to a subduction area of the Pacific belt.

2. The discovery by the team of James Head (2011) of an intense volcanism on Mercury also confirms the heavy interaction between solid U/Th planetary cores and neutrons from the permanent fission processes in stars. Mars, where iron oxide is significant, can be opposed to Venus, with a lot of basalt and volcanoes (where the planet seems an immense volcano bubble), and thus Mercury certainly was even more active but has, in a way, “expired” because of too much neutron fallouts from the Sun burning fast its actinids. The organisation of the Solar System seems in a way to show that in the proto disk, much more compressed, iron separated the dense U and Th chains on one side and the lighter elements on the other (reproducing in reverse the Aston curve), where actinids have likely accumulated in the planets closer to the Sun. Mars is in an intermediary position, where iron from fusion processes in the proto disk would have already accumulated. Gases, partly fused, from ternary fission processes, have been mostly expelled beyond, on the form of giant gas planets. The chondritic asteroid belt would represent a rupture zone (for instance from the impact of a massive object like a very small star) where iron would have been the interface in the proto disk, explaining thus that the iron-rich chondrites do not match the content of planetary cores closer to the Sun. This again suggests a vast amount of U and Th in the cores of planets (as suggested initially by J M Herndon²).

3. It is obvious that gas bubbles would not alone survive close to a black hole. A much heavier star core, made with actinids, would however resist the permanent attraction of the black hole. The recent discovery of proto stars close to a black hole is an excellent confirmation that stars are not made with light elements but with heavy, radioactive actinids, compressed up to a permanent fission reactor thanks to the strength of gravity, where complex nuclear reactions create the hydrogen fuel (tritium for instance is an unfrequent fission product from ternary fission) for the parallel nuclear fusion process and the thermalisation of neutrons, whereas gravity also slows down neutrons.

Positrons from the capture of helium-4 nuclei of actinid decay and ternary fission products (where lighter elements capturing an alpha particle decay by emitting a positron) are one element as they conjoin with neutrons and beta particles of fission products to create hydrogen. Fission products beta particle decay is also crucial and demonstrates here its “usefulness” in the global star cycle. Tritium from ternary fission also is a source for helium-3 which then produces protons through neutron impacts, an explanation for protons in cosmic rays. Ternary fission also rarely produces mere protons which may directly combine with electrons to produce hydrogen. Fission products and their transmutation are a key in production of other elements together with nuclear fusion of for instance helium-4 from ternary fission products (in combination with the electrons of fission products beta decay). Hence ternary fission is key in providing the usual nuclear fusion cycle with its fuel. I claim that light elements in stars are solely the product of nuclear fission, ternary fission products and radioactive decay, through combinations of the elementary particles in a context of high gravity forces and temperature, and of course slow capture of neutrons, which also contributes obviously to the diversity of heavy elements beyond the iron limit of the Aston curve, from fission product activation combined with radioactive decay.

Neutron stars are also an excellent way to see the expulsion of all fission product matter outwards in violent hypercriticality events where only neutrons remain at the end, agglomerated and compressed by their own gravity forces.

A thermonuclear reactor at equilibrium is obvious, where interactions with nearby supernovas are a major and essential factor in star divergence onto supernova through intakes of neutrons and other elements (hydrogen and helium gas for instance) disrupting the internal equilibrium, and “waves of supernovas” from one star to another (one future example could be Saiph, variable supergiant red star near Barnard’s Loop, where the variations of magnitude are a good indicator of the recent impact of neutrons from the supernova that created Barnard’s Loop, or maybe another cloud of gas

2 I discard any relation with his claims on « chemtrails » and « geoengineering »...

in the Orion constellation). These neutrons are major constituents of the masses of accelerated matter that explain gravitational waves (which is also confirmed by the confirmation of gravitational waves in association with the collision of neutron stars, likely to expel a lot of neutrons at impact and implosion under themselves).

Conclusion : In addition to nuclear fission in stars and to the supernova – supervolcano link, I propose, to conclude this paper, a possible alternative process for the Big Bang starting from either a single mass dominated by uranium and thorium, or, as I would believe, a much more exotic atom, much heavier than anything synthesized until now (as research on exotic atoms demonstrated experimentally that these atoms are dominated by spontaneous fission or alpha emission), hence such an exotic atom (maybe a single atom of a mass equivalent to the universe) would have the same behavior, except for the fact that its own weight would compress it under its own gravity, adding a fusion phenomenon to the expected spontaneous fissions, spallations between atoms (where atoms spallate other atoms), leading to a new type of physics where all fundamental forces, including gravity, conflate, explaining the beginning and extremely early dynamics of the Big Bang. The suggested single heavy atom would predate the Big Bang and its explosion / implosion would constitute the actual explanation for the Big Bang.

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Bibliography :

The Hamburg/ESO R-process Enhanced Star survey (HERES) XI. The highly r-process-enhanced star CS 29497-004, V. Hill, N. Christlieb, T. C. Beers, P. S. Barklem, K.-L. Kratz, B. Nordström, B. Pfeiffer and K. Farouqi, 2017, *Astronomy and Astrophysics* 607, A91

First stars – XV. Third-peak *r*-process element and actinide abundances in the uranium-rich star CS31082-001, B. Barbay, M. Spite, V. Hill, F. Primas, B. Plez, R. Cayrel, F. Spite, S. Wanajo, C. Siqueira Mello Jr., J. Andersen, B. Nordström, T. C. Beers, P. Bonifacio, P. François and P. Molaro, 2011, *Astronomy and Astrophysics* 534, A60

Neutrino Geophysics at Baksan: On Searches for Antineutrinos and Radiogenic-Heat Sources in the Interior of the Earth, G. V. Domogatsky, V.I.Kopeikin, L.A.Mikaelyan, and V.V.Sinev, 2004, *Physics of Atomic Nuclei*, 69, 1

Magma storage prior to the 1912 eruption at Novarupta, Alaska, J. Hammer, M. J. Rutherford, W. Hidreth, 2002, *Contributions to Mineralogy and Petrology*, 144, 2

Ice core and palaeoclimatic evidence for the timing and nature of the great mid-13th century volcanic eruption, C. Oppenheimer, 2003, *International Journal of Climatology*, 23, 4

Source of the great A.D. 1257 mystery eruption unveiled, Samalas volcano, Rinjani Volcanic Complex, Indonesia, F. Lavigne, J-P Degeai, J-C Komorowski, S. Guillet, V. Robert, P. Lahitte, C. Oppenheimer, M. Stoffel, C. M. Vidal, Surono, I. Pratomo, P. Wassmer, I. Hajdas, D. S. Hadmoko, E. de Belizal, 2013, *Proceedings of the National Academy of Sciences*, 110, 42

Observation of Gravitational Waves from a Binary Black Hole Merger, B. P. Abbott et al. (LIGO Scientific Collaboration and Virgo Collaboration), 2016, *Physical Review Letters* 116, 6

Légendes et chroniques insolites des Alpes-Maritimes, Edmond Rossi, 2017, Editions des Régionalismes

The feasibility and implications of nuclear georeactors in Earth's core–mantle boundary region, R.J. de Meijer and W. van Westrenen, 2008, South African Journal of Science 104

Major Questions About Deep Continental Structures. G.J. MacDonald. In A. Bodén and K.G. Eriksson. Deep drilling in crystalline bedrock, v. 1. 2008 Springer-Verlag

Flood volcanism in the northern high latitudes of Mercury revealed by MESSENGER, J W Head, C F Chapman, R G Strom, C I Fassett, B W Denevi, D T Blewett, C M Ernst, T R Watters, S C Solomon, S L Murchie, L M Prockter, N L Chabot, J J Gillis-Davis, J L Whitten, T A Goudge, D M Baker, D M Hurwitz, L R Ostrach, Z Xiao, W J Merline, L Kerber, J L Disckon, J Oberst, P K Byrne, C Klimczak, L R Nittler, 2011, Science, 333, 6051

Deep-Earth reactor: Nuclear fission, helium, and the geomagnetic field, D. F. Hollenbach and J. M. Herndon, 2001, Proceedings of the National Academy of Sciences USA, 98, 20