Theory of Negative Nuclear Magnetic Moment for Evidence of Dark Matter and Energy for Accelerating ^{3}He during Solar Flares

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Abstract

Solar flares and coronal mass ejections release plasma during solar storms and activities. Such explosions occur against the huge gravitational attraction of the sun with acceleration of plasma filaments into space away from the sun. Recently, NASA has measured huge enrichment of ^{3}He in such solar flares. The ^{3}He enrichment mechanism is unknown. In this work, the author reports a new mechanism of ^{3}He enrichment via the negative nuclear magnetic moment (NMM) of ^{3}He and its dissipation of -NMM to dark (Dk) field. This mechanism is derived on the basis of prior mechanism of RBL for planetary lightning (plasma) by production of streamers and step leaders in huge electric field of back ground null and or positive NMMs with rattling of trace seed solute nuclei of negative NMMs for inducing local electric fields and Dk fields about the trace – NMMs for seeding path of least resistance among the many step leaders as one leader of more enriched negative NMMs is selected for discharging the lightning channel. Evidence of such a mechanism by RBL is further discussed.

Introduction

^{3}He is one of two stable isotopes of helium. These two isotopes (^{3}He and ^{4}He) are produced inside the sun and other stars by the fusion of hydrogen (^{1}H). As the sun ages, ^{1}H is consumed and ^{3}He and ^{4}He are accumulated. The sun is in its main sequence stage and very young. The sun is thought to continue in main sequence for millions of years. At its young age, the sun is mostly ^{1}H and contains only a trace of ^{3}He and ^{4}He. The sun and other stars are known to undergo solar storms whereby they generate strong magnetic fields and release plasma to the surrounding space for producing cosmic rays. The nature of these solar storms differs as some involve very strong magnetic fields at the surface of the sun, but others may involve weaker magnetic fields at the surface of the sun. As the sun is mostly ^{1}H, the content of the released cosmic particles is expected to have mostly ^{1}H. However, during some solar storms and flares, scientists have observed and measured the release of flares and cosmic particles enriched with ^{3}He. The origin of ^{3}He enriched flares is unknown. It has been noted that such ^{3}He flares originate under weaker surface magnetic storms. Recently, the highest ^{3}He concentrated solar flare was measured by NASA/EPA Solar Orbiter [1]. Although scientists do not understand the mechanism, ^{3}He enormously enriched in the recent solar flares, a team of scientists at Southwest Research Institute [2] has attempted to understand the mechanism in general driving high energy, accelerated particles during solar flares and coronal mass ejections.

Hypothesis

The author proposes that the greater acceleration and isotopic separation of ^{3}He in coronal mass ejections and solar flares are due to the negative nuclear magnetic moment (NMM) of ^{3}He.

Discussion

^{3}He is rare. It is thought that a lot of it accumulated in the core of the earth during the formation of the Solar System and the Earth. The author proposed in 2003 that the unconventional fusion inside the core of the earth forms ^{3}He [3]. The author recently proposed the formations of novel compounds and interactions of noble gases by their nuclear magnetic moments (NMMs). Recently scientists discovered that the high pressures and high temperatures induce the selective formations of compound between iron and ^{3}He [4]. The author has applied his model of NMMs to explain this property of ^{3}He selectively binding Fe (iron) under conditions of high pressures and high temperatures as exist deep in the earth's mantle[3].

Composition of Solar Flares and Unusual Mass to Charge for Explaining Greater ^{3}He Acceleration

Solar flares are composed mostly of hydrogen and helium. Protons and electrons are the most abundant particles. The protons have positive NMMs and the electrons have positive NMMs from outside protons and negative NMMs from inside neutrons (according to RBL's theory). The positive and negative NMMs of the electrons via spin up and spin down pairing could interact to slow the electrons more by electron --- electron interactions. But ^{3}He lacks a counter positive NMM, except by ^{3}T but ^{3}T has different charge. Thereby ^{3}T cannot counter the outward push by Dk field upon ^{3}He during solar flares. Carbon, Nitrogen, Oxygen, Neon, Magnesium, Silicon, Sulfur and Iron are also in solar flares but in lower abundances, than H and He. As goto iron and beyond in periodic table thermodynamically, the stability of fusion decreases and stability of fission increases so tendency for proton + electrons ↔ neutrons decrease, inverse beta processes decrease, use of anti-neutrinos and production of neutrinos decrease, and increase in mass number decreases. But as goto iron and beyond in periodic table, thermodynamically neutron ↔ proton + electron increases, beta process increases, use of neutrons and production of antineutrinos increases, and/or there is increase in the decrease in mass number.

But $^{3}H^{1+}$ Has Similar Mass as $^{3}He^{2+}$

If the mass to charge of ^{3}He (of nucleus of $2p^{+} + 1n^{0}$) causes unusual acceleration, then why does 1 proton and 2 neutron (of nucleus with $1p^{+} + 2n^{0}$) of 3T not cause similar acceleration? The mass of ^{3}He is similar to ^{3}T (^{3}H), but ^{3}He has twice the charge as ^{3}T. But the ^{3}T is more unstable than ^{3}He. ^{3}T may under some conditions of stronger surface magnetic field fiss to accelerate flares and coronal mass ejections of different types. But if the charge is greater for ^{3}He than ^{3}T, then the magnetic field upon acceleration of ^{3}He should be greater. But the ^{3}He has internal spin and NMM in addition to the charge motion. The changing electric field in changing magnetic field of the spin and NMM induces a magnetic field of the nucleons and nucleus for twisting the nucleons and nuclei. The spin in changing electric field causes an induced electric field and charging about the 3He nuclei. In the limit of these inductions, the induced magnetic field snaps as RBL reasoned in 2007 [5] to form gravity from the induced magnetic field. And by such snapping of magnetic field, in 2007 RBL reasoned Dk gravity can form or Br gravity can form depending on clockwise or counterclockwise rotations of quarks. And in the limit of the inductions, RBL reasoned the induced electric field snaps relativistically to induced pressure fields and thermal space. Unlike ^{3}He, ^{3}H has same mass but smaller charge for weaker induced magnetism by its + NMM and Br gravity. In addition to charge, the ^{3}H has positive (+) 2.979 NMM and spin. The ^{3}He has 0.000137% relative abundance, negative (-) 2.12 NMM and spin . ^{3}T has spin of ½ and + 2.979 NMM. ^{1}H has 99.9885 % relative abundance, spin 1 ½ and +2.79 NMM. ^{2}D (^{2}H) has 0.0115 % relative abundance, spin of zero and + 0.857 NMM. Thereby on basis of NMMs the ^{3}T and ^{3}He has dramatic differences in NMMs between two nuclei from +3.979 (^{3}T) to – 2.12 NMM (^{3}He) for dramatic separations of these isotopes of these two elements on basis of large difference of NMMs.

Why would abundant ^{1}H with its positive NMM not produce counter Br field to bind ^{3}He and prevent the solar flares and ^{3}He enrichment in the solar flares at the sun's surface? The p^{+} from ^{1}H are more stable than both ^{3}He and ^{3}T and does not disintegrate and fractionally, reversibly fiss and fuse as much as ^{3}He and ^{3}T. Thereby, the p^{+} is not able to oppose the Dk gravity acting on the ^{3}He to oppose its production and enrichment in the solar flares and coronal mass ejections.

RBL here further reasons that in very magnetized solar flares the ^{3}T may concentrate and the high energy conditions can induce fission of the ^{3}T. The ^{3}He may fiss reversibly, but ^{3}He is more stable than ^{3}T so irreversible fissing of ^{3}T may explain the power of some solar flares and coronal mass ejections under stronger magnetic field at the sun's surface. But the more stable ^{3}He is less likely to fiss irreversibly due to its longer half-life and greater stability relative to ^{3}T. The ^{3}T has filled p^{+} shell and half-filled neutron shell for the instability of the neutron causing ^{3}T's shorter lifetime by

RBL's theory as due to instability of the neutrons due to their dark nature due to fissing of the neutron by beta process. On the other hand, the ^{3}He has filled neutron shell and half field proton shell for stability of the neutron shell and intrinsic stability of the proton due to its bright nature for explaining the greater stability of ^{3}He relative to ^{3}T. But the two neutrons of stability in ^{3}T interfere with each other by spin --- spin interactions so they cannot cause stability of 2 neutrons by 1 proton in ^{3}T for instability of the 2 neutrons and ^{3}T's shorter half-life. The ^{3}He having 2 protons in orbital shells and spin paired, but the ^{3}He still has neutron instability for fissing of the pair of protons but the neutron stabilizes the two protons from irreversible fissing of ^{3}He. In general, by RBL's theory such interactions within and between ^{3}T and ^{3}He can explain the stabilities of more massive nuclei by nucleon molecules and magnetic numbers. By this analysis using the theory of RBL, it is explained why strongly magnetic solar flares are enriched in ^{3}T and weakly magnetic flares are enriched in ^{3}He.

Theory of -NMM Causing ^{3}He Enrichment in Solar Flares with Further Evidence by ^{17}O, ^{25}Mg, and ^{21}Ne Enrichments

The plasma of the sun under weaker magnetization of its surface and solar storms with strong electric fields can undergo the spin fluctuations in the flares of the plasma for inducing magnetic fluctuations of nuclear spins and stronger magnetic fluctuations of the nuclei having negative NMMs relative to nuclei having positive NMMs. Such stronger magnetic fluctuations of negative NMMs are due to the softer nature of multiple nucleon particles of greater neutron contents and net neutronic nuclear orbital momenta and fields of the nuclei with fractional, reversible release of greater negative NMMs by RBL's theory. Such release of negative NMM dissipates to Dk fields by RBL's theory. The positive NMMs have more protons and protonic nuclear orbitals internal to nuclei create positive NMMs and are harder proton orbital and positive NMMs. The released positive NMMs are harder than released negative NMMs from nuclei for harder natures of the positive NMMs by RBL's theory. During solar flares, the nuclei of positive NMMs are less polarizable and negative NMMs are more polarizable; so the negative NMMs create stronger induced electric fields in the plasma and dark fields in the plasma for accelerating the negative NMMs and electrons associated with the negative NMMs. On such basis, the author (RBL) discloses the ^{3}He is more accelerated during flares and coronal mass ejections by weak magnetic solar surfaces due to the negative NMM of ^{3}He and its internal acceleration as the fluctuations of its negative NMMs induce strong electric fields and dark fields for accelerating the ^{3}He in the electric field of the flares. The other nuclei like ^{1}H, ^{3}T, ^{13}C, have positive NMMs. And the ^{15}N and ^{17}O have negative positive NMMs . ^{4}He, ^{12}C, ^{14}N, ^{16}O, ^{18}O, ^{32}S, ^{20}Ne, ^{26}Mg, and ^{29}Si have null (zero) NMMs. These nuclei having negative NMMs are accelerated in the solar flares relative to the nuclei having positive and null NMMs. The author's (RBL) theory is supported here by the additional experimental fact that solar flares are experimentally observed to be enriched in ^{17}O and ^{18}O compared to the sun's bulk composition [6]. Such enrichment of flares in ^{17}O follows from the negative NMM of ^{17}O. The magnetic neutronic rich nature of ^{18}O allows for possible induced negative NMMs in ^{18}O and its enrichment in the solar flares. But what about ^{15}N? ^{15}N has not been observed to be enriched in solar winds and flares. Such absence of ^{15}N enrichment in spite of its negative NMMs may be reasoned by the low overall ^{15}N content in the sun [7]! Mg is also released in solar flares, researchers have measured enrichment of ^{25}Mg relative to ^{24}Mg in solar flares and this is consistent with RBL's theory as ^{25}Mg has negative NMM just as ^{3}He and ^{17}O.

If RBL's theory of the negative NMMs causing the acceleration of ^{3}He and enrichment of ^{3}He is true as proposed by corresponding enrichments of ^{17}O and ^{25}Mg due to their negative NMMs, then elements with nuclei having positive NMMs should be depleted in the solar flares and coronal mass ejections. Scientists have measure the $^{13}C/^{12}C$ isotope ratio of solar flares and did not observe depletion of ^{13}C [8]. The unusual enrichment of ^{13}C is due to the CNO cycle in the sun and the life stage of the stars. It is not that the solar flares enrich in ^{13}C. The increasing age of the sun increases the enrichment of ^{13}C due to CNO cycle for observed increase in ^{13}C in solar and stellar flares. "Large amounts of energy are release from the sun during solar flares. During such energetic releases the isotopic enrichment of ^{33}S has not been observed for consistency here of RBL's model of the flares as ^{33}S has + NMM and should not be enriched in solar flares. Neon isotopes have been measured to enriched in ^{21}Ne and ^{22}Ne relative to ^{20}Ne during solar flares [9]. ^{21}Ne has negative NMM. $^{20}Ne/^{22}Ne = 7.6$ and $^{21}Ne/^{22}Ne \sim 0.11$. $^{20}Ne/^{21}Ne \sim 335$ on earth. In solar flares, $^{20}Ne/^{21}Ne \sim 69$. These enrichments of ^{21}Ne and ^{22}Ne in solar flares is consistent with RBL's theory as ^{21}Ne has negative NMM and ^{22}Ne likely has induced negative NMM.

Comparison to Lightning Mechanism of RBL to Solar Flare Mechanism

Such nature of the plasma on the surface of the sun and other stars for accelerating the negative NMMs more strongly is analogous to RBL's prior theory of the origin of lightning on planets due to atmospheric gases having trace nuclei of negative NMMs. The earth has ^{15}N of negative NMMs and is the origin of lightning streamers and step leaders in the strong electric fields on the earth by RBL's theory as the strong electric fields in the cloud induce electric fields as the ^{15}N NMMs rattle to induce strong electric fields about the negative NMMs of the ^{15}N to induce a path of least resistance through the insulating air on earth. Many step leaders preceded lightning discharge and by RBL's model the step leaders and the organization and enrichment of the negative NMMs find the path that organizes the more - NMMs for focusing the lightning channel. Likewise, the atmosphere of Jupiter and Saturn with its ^{3}He and ^{15}N in ($^{15}NH_3$) in hydrogen solvent gas involves negative NMMs of ^{3}He and ^{15}N to rattle and induce electric fields for streamers and step leaders for wiring lightning across large cloud electric field! Uranus has NH_3 with ^{15}N and the ^{15}N during storms undergo agitations in the strong clouds of Uranus for inducing local electric fields about ^{15}N in $^{15}NH_3$ for creating paths of least resistance in the insulating H_2 gas in Uranus. The NH_3 is liquified and frozen from the atmosphere of Neptune due to the colder temperatures of Neptune. This causes Neptune to lack lightning.

Comparison to Ytterbium and Its Isotope Effect

The recent observation of unusual interactions of Ytterbium nuclei with their surrounding electrons [10,11] is further supportive of RBL's theory of negative NMM of ^{3}He and associated release of Dk energy for causing isotopic fractionation and concentration of ^{3}He isotope in coronal mass ejections. MIT scientists in 2020 [10] initially reported such anomaly among ytterbium isotopes as they performed laser excitations of ytterbium and observed unusual emission spectra with variations among the isotopes that did not fit current theory of electron --- nuclear interactions. They determined that unconventional distortions of the nuclei did not produce sufficiently large altered energies to match the data with 3 sigma certainty. 5 years later a team of scientists headed by Germany replicated this work but improve the accuracy by using frequency combs and gather such isotopic shift in the emission spectra with greater than 23 sigma difference between data and theory by nuclear distortion [11]. The scientists noted a possible explanation of the anomaly could be a dark boson of medium mass interacting with the electrons to cause the discrepancy. The dark photon was noted to originate from neutrons and the number of neutrons varied from isotope to isotope for the ytterbium isotopes for causing the isotope shift. A prior theory of neutrons having more Dk matter on basis of their two down quarks had been given by RBL in 2017 [12]. RBL had also noted that the proton has less Dk internal matter as it has only 1 down quark. RBL associated the up quark with Br matter. RBL further noted the negative NMMs originated from backward motions of down quarks and more negative (–) NMMs and more dissipated Dk fields came from neutrons. But RBL noted the forward motions of up quarks caused the positive (+) NMMs. RBL in 2017 [12] therein noted that fractional, reversible fissing and fusing of nuclei with positive or negative NMMs released + NMM and – NMMs into surrounding electron lattice to alter the electronic shells. RBL also noted that the released + NMM and – NMM dissipated to gravities for Br fields and Dk fields from p^+ and n^0, respectively, and bosons for affecting surrounding electronic shells, subshells, orbitals and electron spins and vice versa [12].

RBL here notes that similar fractional, reversible fissing and fusing of ^{3}He nuclei (as fissing and fusing of Yb nuclei for releasing Dk bosons to surrounding electrons) occur under induction in the Sun's plasma for releasing negative NMMs and Dk fields for accelerating ^{3}He from the surface of the sun outward during the seeding and manifestation of coronal mass ejections from the sun and solar flares. As scientists continue to attempt to explain the data by distortions of Yb nuclei, more difficulties arise as more energies are required for the unusual, needed distortions of the Yb nuclei. RBL here notes that the Dk field and negative NMMs may be the causes of such unusual energetic distortions of the nuclei due to the negative NMMs for providing the unusual large electronic energy changes. RBL noted a relativistic effect for relativistic Little Effect.

This research on Yb determines that nuclei with negative NMMs can be perturbed to release negative NMMs and the negative NMMs can transduce to Dk energy. Thereby such evidence of nuclei with negative NMMs releasing Dk energy supports the possibility of ^{3}He releasing Dk energy as it is agitated in the plasma of the sun and in the solar storms producing solar flares for the Dk fields about ^{3}He and other nuclei with negative or induced negative NMMs (^{17}O, ^{18}O, ^{21}Ne, ^{22}Ne, and ^{25}Mg) in solar flares for opposing the huge Br gravity of the sun and the Br electromagnetic forces of the sun for pushing the ^{3}He and these other isotopes with proclivity for negative NMMs away from the sun for fractionating the isotopes having negative NMMs from other nuclei having 0 NMMs or positive NMMs.

Conclusion

On the basis of the application of the prior theory of RBL for lightning mechanism for plasma generation in atmospheres of planets by trace seeds of negative nuclear magnetic moments (NMMs) of ^{3}He,^{15}N and ^{17}O in helium, ammonia and water gases and vapors of planets, a consistent theory of plasma forming solar flares of thread plasma erupting from the surface of the sun under weak surface magnetic fields is reasoned by the negative NMM and dissipated dark field from ^{3}He for enriching ^{3}He in the solar flares and coronal mass ejections. The known data from mass analyses of other elements and their isotopes in solar flares determine consistent reasoning of enrichments of ^{17}O, ^{21}Ne, and ^{25}Mg on the basis of these nuclides also as ^{3}He having negative NMMs. Although ^{15}N has negative NMM, its non-enrichment in solar flares can be reasoned by its involvement in the CNO cycle and the involvement has it interacting strongly with the abundant ^{1}H solvent in the sun such that the depletion of ^{1}H causes the ^{1}H solvent to strip the binding ^{15}N from the forming solar flare in spite of ^{15}N's negative NMM. The author would like to note a similar interaction of ^{15}N with ^{1}H as reasoned by the author and reported on controversial superconductivity in nitrogen doped lutetium hydride. The author further notes for solar plasma the data shows enrichment of ^{13}C and such enrichment for ^{13}C can be reasoned as the ^{13}C is apart of the CNO cycle and binding ^{1}H in the cycle. The author reasoned that ^{13}C due to its positive NMM does not bind the ^{1}H as strongly as the ^{15}N of negative NMMs. Due to the weaker binding of ^{13}C to ^{1}H the ^{1}H does not as well strip the ^{13}C from the forming and erupting solar flares as it depletes^{15}N from the solar flares. On earth as far as ^{13}C interacting with ^{1}H in comparison to ^{15}N interacting with ^{1}H, the author notes this may explain the need higher pressures (relative to lower pressures for nitrogen doped lutetium hydride) for carbonaceous sulfur hydrides. But back to the sun, in conclusion it could be that the sun and stars are super fluids. Further consistency with the model (beyond ^{3}He, ^{13}C and ^{15}N) includes the observed depletion of positive NMMs like ^{1}H, ^{10}B and ^{33}S. In addition to the positive NMMs of ^{10}B, ^{10}B is involved in nuclear reactions ($^{10}B(p,\alpha)^{7}Be$ reaction) that consumes ^{10}B as it is produced in the sun. The depletion of ^{10}B thereby prevents enrichment in the sun as the sun ages and possible depletion in solar flares of ^{10}B as by its positive NMMs. ^{33}S is also observed to deplete in solar flares as is consistent with RBL's theory and model as ^{33}S has positive NMM. The various nuclei having null (0) NMM also further proves RBL's model as these nuclei (^{4}He, ^{12}C, ^{16}O, and ^{20}Ne) are seen not to enrich in solar flares. Further proof and consistency of RBL's model of negative NMM and dissipating dark fields causing ^3He to enrich and accelerate the solar flares is found in the recently confirmed anomalous isotope effect in Yb (ytterbium) and the possibility that Dk bosons and negative NMMs severely distort Yb's nuclei and/or interact with surrounding electrons for altering the florescence spectra beyond the standard model.

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