Journal Name:	Asian Journal of Research and Review in Physics
Manuscript Number:	**Ms_AJR2P_48664**
Title of the Manuscript:	**On the role of squared neutron number in reducing nuclear binding energy in the light of Electromagnetic, Weak and Nuclear gravitational constants – A Review**
Type of the Article	**Review Article**

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PART 1: **Review Comments**

	Reviewer's comment	**Author's comment** *(if agreed with reviewer, correct the manuscript and highlight that part in the manuscript. It is mandatory that authors should write his/her feedback here)*
Compulsory REVISION comments		
Minor REVISION comments	The manuscript will be acceptable after addressing the following comments. (1) English must be carefully corrected in the whole manuscript, for example in Section 8, serial no 2",…it is very to clear say that…" must be written as "it is very clear to say that". (2) The author(s) must compare their study with the published work. (3) What percentage or how much the present study implement gravity in microscopic study? (4) What are the new predictions of the present study in comparison to other study? (5) What will happen if the adjusting coefficient in Eq. (16) is not taken in the range 90 to 100. (6) Please do not use we, our, us etc. in the manuscript. Replace them with proper phrases in the whole manuscript. (7) Why the 5 energy coefficients are not connected with the unification paradigm? Mathematically and physically explanation is necessary. (8) Provide a correlation of the present study with fluid mechanics at atomic scale. The following papers must be studied in this regard and cite all theses in introduction to enrich the quality of the paper. (i) Thin film flow of a second-grade fluid in a porous medium past a stretching sheet with heat transfer. (2017) Alexandria Engineering Journal, https://dx.doi.org/10.1016/j.aej.2017.01.036. (ii) Thermophoresis and thermal radiation with heat and mass transfer in a magnetohydrodynamic thin film second-grade fluid of variable properties past a stretching sheet (2017) European Physical Journal Plus, 132, 11, https://dx.doi.org/10.1140/ep jp/i2017-11277-3. (iii) Magnetohydrodynamic nanoliquid thin film sprayed on a stretching cylinder with heat transfer.(2017) (http://www.mdpi.com) Journal of Applied Sciences, 7, 271. (iv) Flow and heat transfer in water based liquid film fluids dispensed with graphene nanoparticles (2018) Results in Physics, 8:1143-1157. https://dx.doi.org/10.1016/j.rinp.2018.01.032. (v) Mixed convection in gravity-driven thin film non-Newtonian nanofluids flow with gyrotactic microorganisms, (2017) Results in Physics, 7:4033-4049. http://dx.doi.org/10.1016/j.rinp.2017.10.017 (vi) Non-Newtonian nanoliquids thin film flow through a porous medium with magnetotactic microorganisms. Journal of Applied Nanoscience, (2018) https://dx.doi.org/10.1007/s13204-018-0834-5 (vii) Magnetohydrodynamic second grade nanofluid flow containing nanoparticles and gyrotactic microorganisms. Journal of Computational and Applied Mathematics. 2018, 37, 6332–6358, https://dx.doi.org/10.1007/s40314-018-	Dear sir, **Introduction** Considering neutrons and protons as microscopic molecules, the liquid drop model treats the atomic nucleus as a drop of incompressible nuclear fluid of very high density bound by strong nuclear force. The residual effect of the strong nuclear force plays a crucial role in understanding nuclear binding. Mathematical analysis of the model delivers a formula to predict the binding energy of any atomic nucleus in terms of its number of protons and neutrons with five different energy terms and five different energy coefficients. Energy coefficients of the formula are chosen in such a way to fit the wide range of nuclear binding energy data partly based on theory and partly based on empirical measurements. Hence 'liquid drop formula' is generally called as 'Semi empirical mass formula (SEMF). Even though, many scientists reviewed the formula in different ways, as on today, the syntax of the formula almost remains the same with very minor changes [1-6]. In this context, authors would like to emphasize the fact that, physics and mathematics associated with fixing of the energy coefficients of SEMF are neither connected with residual strong nuclear force nor connected with strong coupling constant. Since nuclear force is mediated via quarks and gluons, it is necessary and compulsory to study the nuclear binding energy scheme in terms of nuclear coupling constants. In this direction, N. Ghahramany and team members have taken a great initiative in exploring the secrets of nuclear binding energy and magic numbers [7-11]. Very interesting point of their study is that - nuclear binding energy can be understood with two or three terms with single energy coefficient. Now days a lot of progress is taking place in the fields of fluid mechanics at atomic and nano scales [12-17]. As the origin of SEMF was 'Fluid Mechanics', authors hope that, by considering a combined study on the residual nuclear force, ground sate quarks, strong coupling constant and atomic scale fluid mechanics, it may be possible to understand nuclear binding energy in a unified picture. Recently published work : New integrated model proposed by N. Ghahramany et al [7] N. Ghahramany et al. Quark-Gluon Plasma Model and the Origin of Magic Numbers. Iranian Physical Journal, 1-2, 35. (2007). [8] N. Ghahramany et al. Nuclear Magic Numbers based on a Quark-like Model is Compared with the Boltzmann Distribution Model from Nuclear Abundance in the Universe and Low Energy Nuclear Reactions. PHYSICS ESSAYS, 21-3, 200 (2008). [9] N. Ghahramany et al. New scheme of nuclide and nuclear binding energy from quark-like model. Iranian Journal of Science & Technology. IJST A3: 201-208 (2011) [10] N. Ghahramany et al. New approach to nuclear binding energy in

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(viii) Bioconvection in second grade nanofluid flow containing nanoparticles and gyrotactic microorganisms (2018) Brazilian Journal of Physics, 48(3):227-241, https://dx.doi.org/10.1007/s13538-018-0567-7

(ix) Study of two dimensional boundary layer flow of a thin film fluid with variable thermo-physical properties in three dimensions space. Journal of AIP Advances, 2018, 8, 105318. https://dx.doi.org/10.1063/1.5053808

(x) Simulation of bioconvection in the suspension of second grade nanofluid containing nanoparticles and gyrotactic microorganisms. Journal of AIP Advances 2018, 8, 105210. https://dx.doi.org/10.1063/1.5054679

(xi) Slip flow of Eyring-Powell nanoliquid film containing graphene nanoparticles due to an unsteady stretching sheet with heat transfer. Journal of AIP Advances 2018, 8, 115302. https://dx.doi.org/10.1063/1.5055690

(xii) Brownian motion and thermophoresis effects on MHD mixed convective thin film second-grade nanofluid flow with Hall effect and heat transfer past a stretching sheet. Journal of Nanofluids 2017, 6(5): 812-829, https://dx.doi.org/10.1166/jon.2017.1383.

(xiii) Hall current and thermophoresis effects on magnetohydrodynamic mixed convective heat and mass transfer thin film flow. Journal of Physics Communications (2018), https://dx.doi.org/10.1088/2399-6528/aaf830.

(xiv) Entropy generation in MHD mixed convection non-Newtonian second-grade nanoliquid thin film flow through a porous medium with chemical reaction and stratification, Journal of Entropy, 2019, 21, 139; https://dx.doi:10.3390/e21020139

(xv) Influence of inclined magnetic field on Carreau nanoliquid thin film flow and heat transfer with graphene nanoparticles. Journal of Energies (MDPI), 2019, 12, https://dx.doi: 10.3390/en12010001

(xvi) Entropy generation in two phase model for simulating flow and heat transfer of carbon nanotubes between rotating stretchable disks with cubic autocatalysis chemical reaction. Journal of Applied Nanoscience, https://dx.doi: 10.1007/s13204-019-01017-1

integrated nuclear model. Journal of Theoretical and Applied Physics 2012, 6:3

[11] N. Ghahramany et al. Stability and Mass Parabola in Integrated Nuclear Model. Universal Journal of Physics and Application 1(1): 18-25, (2013).

Regarding the adjusting coefficients (90 to) to (100):

Readers are encouraged to see references there in [10] for derivation part and other details pertaining to the estimation of the adjusting coefficient (90 to 100) [11]. Points to be noted are- close to the beta stability line, $\left[\frac{N^2-Z^2}{3Z}\right]$ takes care of the combined effects of coulombic and asymmetric effects and nuclear binding energy can be addressed with a single energy coefficient.

Scope of this work

(1) Current nuclear physical models and String theory models [43-45] are failing in implementing gravity in nuclear physics. In this context, authors proposed concepts can successfully be implemented in nuclear physics.
(2) Nuclear charge radii, nucleon magnetic moments, nuclear stability, nuclear binding energy, magic proton numbers [5,6,34], nucleons kinetic energy [35] and atomic radii can be understood in terms of gravity. Super heavy elements can also be studied in this direction.
(3) Hadronic mass spectrum and melting points of quarks can be understood [36].
(4) Strong coupling constant, Fermi's weak coupling constant, Newtonian gravitational constant and Avogadro number can be studied in a unified manner [37,38].
(5) Astrophysical mass units like Chandrasekhar mass limit [46] and neutron star mass limit [47,48] can be understood.
(6) Recently observed astrophysical emission line of 3.5 keV [38,49,50] can be understood.

Added references on nuclear binding energy

[4] G. Royer and A. Subercaze. Coefficients of different macro-microscopic mass formula from the AME2012 atomic mass evaluation, Nucl.Phys.A917 (2013) 1 – 14.
[5] S.Cht. Mavrodiev and M.A. Deliyergiyev. Modification of the Nuclear Landscape in the Inverse Problem Framework using the Generalized Bethe-Weizsäcker Mass Formula. Int.J.Mod.Phys. E27 (2018) 1850015.
[6] X. W. Xiaa et al. The limits of the nuclear landscape explored by the relativistic continuum Hatree-Bogoliubov theory. Atomic Data and Nuclear Data Tables 121-122 (2018) 1-215

References on On Fluid mechanics at Atomic scale.

		[12] Padmanabhan T. The hydrodynamics of atoms of spacetime: gravitational field equation is Navier-Stokes equation. Int J of Modern Physics 20: 2817-2822, (2011) [13] Delplace F. Viscous liquid spacetime and its consequences. Infinite Energy Magazine 21: 34 -38, (2015) [14] Franck Delplace. Fluid Mechanics at Atomic Scale. Fluid Mech Open Acc 3:2 (2016) [15] Noor Saeed Khan et al. Brownian motion and thermophoresis effects on MHD mixed convective thin film second-grade nanofluid flow with Hall effect and heat transfer past a stretching sheet. Journal of Nanofluids, 6(5): 812-829, (2017) [16] Zaman Palwasha et al. Study of two dimensional boundary layer flow of a thin film fluid with variable thermo-physical properties in three dimensions space. Journal of AIP Advances, 8, 105318 (2018) [17] Noor Saeed Khan et al. Entropy generation in MHD mixed convection non-Newtonian second-grade nanoliquid thin film flow through a porous medium with chemical reaction and stratification. Journal of Entropy, 21, 139, (2019)
Optional/General comments		

PART 2:

	Reviewer's comment	**Author's comment** *(if agreed with reviewer, correct the manuscript and highlight that part in the manuscript. It is mandatory that authors should write his/her feedback here)*
Are there ethical issues in this manuscript?	*(If yes, Kindly please write down the ethical issues here in details)*	