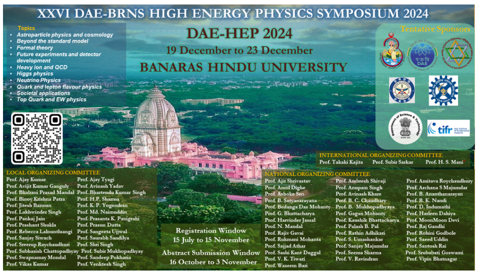

Contribution ID: **490** Type: **Postar**

Estimating the Newtonian gravitational constant with Fermi's weak coupling constant via 4G model of final unification

In our recent publications pertaining to 4G model of final unification, we have proposed three assumptions. First assumption is: There exists a weak fermion of rest energy $M_{wf}c^2 \cong 584.725$ GeV. Second assumption is: There exists a nuclear charge of magnitude $e_n \cong 2.9464e$. Third assumption is: For the weak, nuclear and electromagnetic interactions, there exists three large gravitational coupling constants, $G_w \cong 2.909745 \times 10^{22}\ m^3kg^{-1}sec^{-2}$, $G_n \cong 3.329561 \times 10^{28}\ m^3kg^{-1}sec^{-2}$ and $G_e \cong 2.374335 \times 10^{37}\ m^3kg^{-1}sec^{-2}$ respectively. Objective: To estimate the magnitude of the Newtonian gravitational constant G_N with Fermi's weak coupling constant G_F via 4G model of final unification. Method: With reference to the proposed weak fermion and proton, it seems possible to fit the Fermi's weak coupling constant, $G_F \cong \hbar c\left(\frac{2G_wM_{wf}}{c^2}\right)^2 \cong \left[\left(G_e^2G_N\right)^{\frac{1}{3}}m_p^2\right]\left(\frac{2G_nm_p}{c^2}\right)^2$. Conclusion: There is a scope for the combined study of weak, electromagnetic, nuclear and gravitational interactions at fundamental level. Proceeding further, Newtonian gravitational constant can be estimated from atomic and nuclear physical constants and the estimated value can be considered as a reference for ongoing and future experimental results.

Field of contribution

Theory

Authors: UTPALA VENKATA, Satya Seshavatharam; Dr T, Gunavardhana Naidu (Aditya Institute of Technology and Management); Prof. S, Lakshminarayana (Andhra University)

Presenter: UTPALA VENKATA, Satya Seshavatharam

Track Classification: Beyond the standard model