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Quantum Gravitational Force and its Consequences

We introduce a new quantum gravitational force $F_{PN} = \frac{G_N \hbar}{c} \frac{m}{r^3}$ by using the fundamental constants, like $\hbar$, c, G_N, where G_N, $\hbar$ and c are the Newtonian, the Planck constants and velocity of light. It turns out that conditions of equalities of this force with the Newtonian, the strong interacting-Yukawa type forces give exact physical meaning of the Planck length and the Compton length of a wave. Moreover, equality conditions of this force with the Coulomb and the Dirac magnetic monopole's forces give rise to introduce the concept of the running coupling constant $\alpha(E) = \alpha \ln(1 + \frac{E}{\mu})$ and to obtain mass formula $M_{mon} = M_{Pl} \frac{1}{\sqrt{\alpha}}$ for a magnetic monopole, where $\alpha = \frac{e^2}{\hbar c}$ is the fine structure constant. Physical meaning of the vacuum energy is also considered.

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