Abstract Submitted
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A quantum mechanical model of a gravastar: Black hole without singularity BALJEET LOTTE, SUBODHA MISHRA, Siksha O Anushandhan (Deemed to be University) — A degenerate system of N-self gravitating fermions, when undergoes gravitational collapse can form a Schwarzschild-like black hole having no singularity at the center but with an event horizon at the Schwarzschild radius. We formulate this quantum mechanical model of the gravastar, by choosing a single particle trial density in the Thomas-Fermi approach and also using the uncertainty relation by special relativizing the Newtonian quantum gravity. We derive the exact ground state energy of a system of N self-gravitating fermionic particles, corrections to Schwarzschild radius, and Hawking temperature. In GTR the Buchdahl limit is associated with the central singularity, though in the post-Newtonian approximation of GTR, there is no such limit. It is interesting to note that in our quantum mechanical model of the gravastar as a compact object, no Buchdahl limit exists with or without the post-Newtonian approximation. REFERENCES: S. Mishra and B. K. Lotte. Mod. Phys. Lett. A 33,1850178 (2018). B. K. Lotte and S. Mishra, Mod. Phys. Lett. A 35, 2050081(2020). S. W. Hawking, Commun. Math. Phys. 43, 199 (1975).

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