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The Classical Point Particle Singularity: An Illusion in GR and Elsewhere!

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Singularities in Newton's gravity, in general relativity (GR), in Coulomb's law, and elsewhere in classical physics, stem from two ill conceived assumptions that, a) there are point-like entities with finite masses, charges, etc., packed in zero volumes, and b) the non-quantum assumption that these point-like entities can be assigned precise coordinates and momenta. In the case of GR, we argue that the classical energy-momentum tensor in Einstein's field equation is that of a collection of point particles and is prone to singularity. In compliance with Heisenberg's uncertainty principle, we propose replacing each constituent of the gravitating matter with a suitable quantum mechanical equivalent, here a Yukawa-ameliorated Klein-Gordon (YKG) field. YKG fields are spatially distributed entities. They do not end up in singular spacetime points nor predict singular blackholes. On the other hand, YKG waves reach infinity as 1 r⊠^−(⊠±⊠ ⊠)⊠. They create non-Newtonian and non-GR gravity forces that die out as ⊠−1 instead of ⊠−2. This feature alone is capable of explaining the observed flat rotation curves of spiral galaxies, and one may interpret them as alternative gravities, dark matter paradigms, etc. There are ample observational data encapsulated in the Tully-Fisher relation to support these conclusions.

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