Generalized Uncertainty Principle, White Dwarfs, and Cosmological Constant

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The uncertainty principle is modified when gravity is taken into the account. This so-called "Generalized Uncertainty Principle" (GUP) has been widely studied in the literature, especially in the context of black hole physics, which yields a remnant as the end stage of Hawking evaporation. When applied to white dwarfs however, GUP seems to remove the Chandrasekhar limit. We discuss at least two ways to avoid this unwanted feature – (i) taking the GUP correction parameter to be negative, which corresponds to "classicalization" of Planck scale physics, and (ii) taking into account the cosmological constant. The second approach is interesting since the existence of white dwarfs in turn put a bound on the cosmological constant. While still much larger than the observed value, this bound is many order of magnitude smaller than the "natural" scale from quantum field theory.