

The Minimal Weak Gravity Conjecture

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We examine the minimal constraints imposed by the Weak Gravity Conjecture (WGC) on the particle spectrum of quantum gravity theories. Recently, we argued for the existence of a minimal radius in circle reductions of generic quantum gravity theories. Consequently, whenever a minimal radius exists and the WGC is satisfied at the particle level below the black hole threshold by some states, these states are sufficient for consistency under dimensional reduction, even without a tower of super-extremal particles. Conversely, the absence of a minimal radius always coincides with the presence of a weakly coupled super-extremal tower of particle states. This observation motivates the Minimal Weak Gravity Conjecture, which posits that towers of super-extremal particles appear only when required for consistency of the WGC under dimensional reduction. The talk is based on [2312.04619].

Presenter: MININNO, Alessandro

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