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The weak-gravity bound in asymptotically safe gauge-gravity systems

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In this talk I will discuss the weak-gravity bound, which has been discovered in asymptotically safe gravity-matter systems. It limits the maximum strength of the gravitational fluctuations. Specifically, I will discuss the weak-gravity bound in gauge-gravity systems with more than one gauge field, to discover whether systems with 12 gauge fields (like the Standard Model) exhibit such a bound and whether the gravitational fixed point evades it. Furthermore, I will highlight that the existence of the weak-gravity bound in gauge-gravity systems also has important phenomenological consequences: it is key to a proposed mechanism that bounds the spacetime dimensionality from above to four or five dimensions. I will discuss strengthened evidence for this mechanism, which indicates that the predictive power of the asymptotic safety paradigm could extend to parameters of the spacetime geometry. Finally, I will present first steps towards investigating the weak-gravity bound beyond polynomial truncations.

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