Contribution ID: **29** Type: **Oral Presentation**

Weak Gravity Conjecture for dilaton de Sitter black holes in extra dimension

Tuesday, 4 July 2023 11:20 (20 minutes)

The Weak Gravity Conjecture (WGC) is a theoretical conjecture that relates gravity to other forces within the framework of an Effective Field Theory (EFT). One of the primary motivations behind the WGC is to provide a kinematic constraint on the decay of extremal black holes. This kinematic constraint arises from the notion that the black hole must decay to states that are incapable of forming new black holes. As such, objects that would give rise to naked singularities, which are prohibited under the Weak Cosmic Censorship hypothesis, must be particles.
In this talk, we consider charged black hole solutions of the Einstein-Maxwell-dilaton theory in de Sitter space. Our investigation focuses on examining the location and existence of horizons as a function of the parameters for mass (M), charge (Q), and dilaton coupling strength (α) in the context of extra-dimensional spacetimes, and investigating possible modifications of the Weak Gravity Conjecture in the extra-dimensional spacetimes. In n-dimensions, for a spatial value of $\alpha_c^2 = \frac{(n-3)^2}{(n-1)}$, we observe that there is a new extremality condition, or a new WGC bound. Moreover, we find that, because of the complexity of the metric for $\alpha < \alpha_c$, the extremal case is not achieved for the de Sitter space.

Apply to be considered for a student ; award (Yes / No)?

No

Level for award;(Hons, MSc, PhD, N/A)?

N/A

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Session Classification: Theoretical and Computational Physics

Track Classification: Track G - Theoretical and Computational Physics