Contribution ID: **32** Type: **Oral**

Lyapunov Exponents, Phase Transitions, and Chaos Bound of ModMax AdS Black Holes

Saturday 1 November 2025 15:07 (13 minutes)

We study the thermodynamic phase transition of ModMax anti-de Sitter (AdS) black holes using Lyapunov exponents of massless and massive particles in unstable circular orbits. Our results demonstrate that the thermal profile of the Lyapunov exponent serves as an efficient probe of the black hole's phase structure. We calculate the discontinuity in the Lyapunov exponent across the transition and show that it acts as an order parameter, exhibiting a critical exponent $\delta = 1/2$ in the vicinity of the critical point. Furthermore, we explore the violation of the chaos bound, finding that the bound is violated when the horizon radius falls below a threshold value. We also examine how the ModMax parameter and the particle's angular momentum modify this threshold, revealing their role in controlling the onset of chaos bound violation.

Authors: AWAL, Mozib; Dr PHUKON, Prabwal (Dibrugarh University)

Presenter: AWAL, Mozib

Session Classification: Oral Presentations

Track Classification: Track 01: High Energy Physics, Gravitation and Cosmology