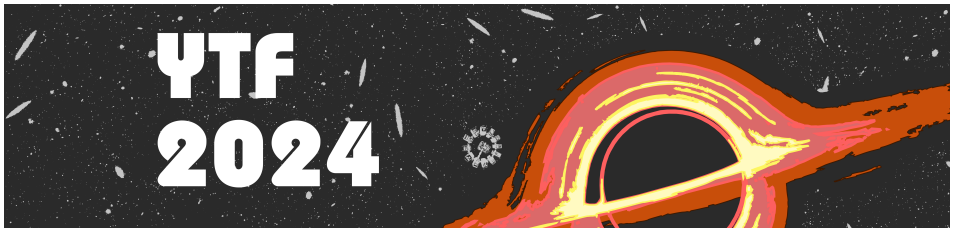

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Multi-metric black holes and the Gregory-Laflamme instability

Thursday, 19 December 2024 15:50 (30 minutes)

Multi-metric gravity is the umbrella term for a class of modified gravitational theories, motivated by a number of problems at the interface between gravity and particle physics, that extend general relativity (GR) via the inclusion of additional interacting massive spin-2 fields beyond the single massless graviton of GR. Nonlinearly, the extra interactions manifest as a framework where multiple metric tensors interact with one another on the same spacetime manifold (hence the name). To date, black hole solutions of these multi-metric theories are only understood for the simplest case of bigravity (N=2 metrics) in 4 dimensions. It is, for example, known that one class of bigravity black holes is unstable for certain values of the graviton mass, with the instability taking the same form as the notorious Gregory-Laflamme (GL) instability plaguing higher dimensional black strings. In this talk, I will show how to generalise the 4d bigravity results to the full multi-metric theory in arbitrary dimension, constructing a wide class of black hole solutions of the general theory, and determine their linear stability. I will also elucidate the link between the instabilities of these multi-metric black holes and those of higher dimensional black strings. The result seems to suggest that the GL instability may be more fundamentally linked to the nature of massive spin-2 interactions.

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