

Numerical relativity in biscalar-tensor gravity

Friday 31 October 2025 15:30 (15 minutes)

The search for modifications to Einstein's theory of general relativity has become increasingly intriguing as recent and upcoming gravitational wave experiments open a new window to probe gravity with compact objects such as black holes. One natural extension to general relativity arises from the four-dimensional string-inspired effective field theory of gravity which introduces two scalar fields, (non)minimally coupled to curvature as well as coupled to each other. To consider the effect of these interactions in strong gravity environments, I will present numerical relativity simulations of two scalar fields evolving around single and binary black holes to consider the dynamical formation of the black-hole hairs using my open-source parameterized numerical relativity code, Canuda-AxiDil. We find an enhanced deviation from general relativity due to the coupling between the fields and demonstrate the presence of hair growth and radiative modes during the binary black hole inspiral, potentially leaving an imprint of the resulting gravitational wave.

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Session Classification: Friday Afternoon Session 1