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Asymmetric binaries: a tale of two sides

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In this talk I will discuss in which cases black holes carry a scalar charge, and the implications when the latter scales with the black hole mass. I will talk about the phenomenological consequences of these insights for the physics of compact binaries, and how asymmetric systems evolving in the LISA band are ideal sources for searches of new fundamental fields coupled to gravity. I will lay out the framework for modelling such binaries in an effective field theory approach, and present some first forecasts on LISA's ability to constrain the properties of scalar fields from future gravitational wave observations

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