ID de Contribution: **50** Type: **TESTS DE LA RELATIVITÉ GÉNÉRALE ET THÉORIES ALTERNATIVES**

Metric reconstruction with gravitational waves and shadows

jeudi 1 avril 2021 15:00 (15 minutes)

In this talk I present three recent works [1,2,3] that aim to enhance our understanding of reconstructing black hole space-times from different type of observations. While gravitational wave detectors like LIGO/Virgo allow to perform black hole spectroscopy of stellar mass black holes, images such as those produced by the Event Horizon Telescope provide information of the shadow from super massive black holes. A theory agnostic approach starting from a parametrized metric is combined with Bayesian analysis to infer possible metric deviations from simulated quasi-normal modes, as well as from the observed size of the shadow of M87*. It is demonstrated under what simplifying assumptions both type of inverse problems can be studied, as well as what conceptual difficulties arise in a theory agnostic approach. Finally, it is highlighted how both type of observations are complementary to each other and how consistent calculations for parametrized metrics can be done in alternative theories of gravity.

[1] Bayesian Metric Reconstruction with Gravitational Wave Observations, Sebastian H. Völkel and Enrico Barausse, Phys. Rev. D 102, 084025, 2020, https://arxiv.org/abs/2007.02986

[2] EHT tests of the strong-field regime of General Relativity, Sebastian H. Völkel, Enrico Barausse, Nicola Franchini and Avery E. Broderick, in review, https://arxiv.org/abs/2011.06812

[3] An exact theory for the Rezzolla-Zhidenko metric and self-consistent calculation of quasi-normal modes, Arthur G. Suvorov and Sebastian H. Völkel, Phys. Rev. D 103, 044027, 2021, https://arxiv.org/abs/2101.09697

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