Dipartimento di Fisica
Università di Cagliari
INFN, Sezione di Cagliari

INFN CAGLIARI

High Energy Physics Colloquia

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Tidal deformations and Love numbers in GR and beyond

Abstract

Compact objects can be deformed in presence of external tidal fields. Tidal deformability is important in a number of astrophysical phenomena and contributes to the gravitational waveform produced by the merging of black holes and neutron stars.
It is well-known that Schwarzschild black holes do not tidally deform, i.e. they have zero Love numbers.
In this talk, I report on recent developments on the linear response of a Kerr black hole embedded in a weak and slowly varying multipolar tidal environment.
This linear response vanishes identically for an axisymmetric perturbation, while it contributes to the Geroch-Hansen multipole moments of the perturbed Kerr geometry for a non-axisymmetric perturbation. This non-zero linear response can be interpreted as non-vanishing Love numbers (in a broader sense) and reproduces the well-known physical phenomenon of tidal torquing of a spinning body interacting with a tidal gravitational environment.
In addition, I report new results on Love numbers when general-relativistic black-hole solutions are interpreted as solutions of modified and extended theories of gravity.

External Link:

Presentation room here.

Slides can be found on the INFN HEPC website
or at the indico event link after the seminar.

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