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Binary systems as gravitational wave detectors

Tuesday 26 April 2022 15:00 (1h 20m)

The passage of gravitational waves (GWs) through a binary perturbs the trajectories of the two bodies, potentially causing observable changes to their orbital parameters. In the presence of a stochastic GW background (SGWB) these changes accumulate over time, causing the binary orbit to execute a random walk through parameter space. In this talk I will present a new formalism for calculating the full statistical evolution of a generic binary system in the presence of a SGWB, capturing all six of the binary's orbital parameters. I will show how this formalism can be applied to timing of binary pulsars and lunar laser ranging, thereby setting novel upper limits on the SGWB spectrum in a frequency band that is currently inaccessible to all other GW experiments.

Presenter: BLAS, Diego (UAB-IFAE)