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Bridging the μHz gap in the gravitational-wave landscape with binary resonance

mercredi 8 décembre 2021 18:30 (10 minutes)

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 powerful 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 used to set novel upper limits on the SGWB spectrum in the ⊠Hz frequency band, between the regions probed by LISA and pulsar timing arrays. As examples of the discovery potential of these methods, I will show how they are able to probe GWs from cosmological phase transitions in a region of parameter space that is inaccessible with LISA and other experiments, and will discuss how they might shed light on the possible SGWB signal detected by NANOGrav.

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Classification de Session: LISA CosWG Workshop day 1