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A semianalytic Fisher matrix for precessing BH-NS binaries

RICHARD O'SHAUGHNESSY, Rochester Institute of Technology, PRAKASH NEPAL, University of Milwaukee-Wisconsin, ANDREW LUNDGREN, Albert-Einstein Institute, Hannover — Gravitational waves from precessing black hole-neutron star (BH-NS) binaries let us constrain that binary's properties: the two masses and BH spin. Robust parameter inference, for example by Markov-Chain Monte Carlo, can directly ascertain how well these parameters can be measured. Still, the Fisher matrix provides valuable insight into what parameters can be measured and why, useful both when interpreting more robust results and when extrapolating what science future detectors and detections may enable. In this talk, we describe how to evaluate, simplify, and understand the Fisher matrix for precessing BH-NS binaries. Building on prior work, we simplify the dynamics and signal using a corotating frame; substitute this representation into the Fisher matrix; and demonstrate how the Fisher matrix arises as a sum over multiple harmonics.

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