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Rethinking Resonance Detectability during Binary Neutron Star Inspiral: Accurate Mismatch Computations for Low-lying Dynamical Tides

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Tidal forces excite oscillatory modes of a neutron star in a binary system as the inspiral sweeps through the mode's resonant frequency. The excitation of the oscillatory modes imprints frequency-dependent signatures on the emitted gravitational waveform. These manifest as a sudden phase change in the waveform and an advance in the merger time of up to a millisecond or so.

In this talk we quantify when such resonant effects become observable by current and next-generation gravitational wave observatories. We compare waveforms with and without a resonance to assess the detectability of these effects, and explore the possibility of identifying resonant signatures from previously observed binary neutron star events.

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