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Numerical Relativity Insights into Tidal Resonance Phenomena

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Gravitational wave observations of neutron star collisions offer a unique avenue into a regime where gravity and matter entangle strongly and evolve dynamically. As these waves travel essentially undistorted through the cosmos to reach the detectors, they constitute the most promising messenger to probe into nuclear physics at extreme densities and low temperatures. In this talk, we will focus on the imprint on the waveforms left by the tidal resonance phenomenon that could happen in the last 100 milliseconds of inspiral. After introducing the analytic model for such effects, we will present recent results of numerical simulations where we confirm in part our theoretical understanding while revealing further issues that require the next level of modeling.

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