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Generating Gravitational Waveforms Beyond BBHs Using Waveform Splicing KEVIN BARKETT, VIJAY VARMA, MARK SCHEEL, YANBEI CHEN, Caltech, SXS COLLABORATION — It is important for gravitational wave detectors to distinguish between binary black hole mergers and systems that incorporate additional physics, such as the presence of neutron star matter or beyond-GR effects. Properly capturing this additional information requires waveform models that encompass the space of theoretically possible waveforms to match against detector data. However, running full numerical simulations over the entire parameter space, including matter or additional physics, is prohibitively expensive, while analytic perturbative results lack the requisite accuracy for comparison. 'Waveform Splicing' utilizes those perturbative expressions to enhance the numerical solutions of binary black hole coalescence, sidestepping the drawbacks of both methods. We demonstrate how Waveform Splicing can be used to incorporate tidal information for binary neutron stars, as well as the merger of black hole objects in theories beyond GR.

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