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Modeling Binary Neutron Stars CONNER PARK, JOCELYN READ, ERIC FLYNN, VERONICA LOCKETT-RUIZ, Cal State Univ- Fullerton — Gravitational waves, predicted by Einstein's Theory of Relativity, are a new frontier in astronomical observation we can use to observe phenomena in the universe. Laser Interferometer Gravitational wave Observatory (LIGO) is currently searching for gravitational wave signals, and requires accurate predictions in order to best extract astronomical signals from all other sources of fluctuations. The focus of my research is in increasing the accuracy of Post-Newtonian models of binary neutron star coalescence to match the computationally expensive Numerical models. Numerical simulations can take months to compute a couple of milliseconds of signal whereas the Post-Newtonian can generate similar signals in seconds. However the Post-Newtonian model is an approximation, e.g. the Taylor T4 Post-Newtonian model assumes that the two bodies in the binary neutron star system are point charges. To increase the effectiveness of the approximation, I added in tidal effects, resonance frequencies, and a windowing function. Using these observed effects from simulations significantly increases the Post-Newtonian model's similarity to the Numerical signal.

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