Abstract Submitted
for the APR18 Meeting of
The American Physical Society

Aligned-spin numerical relativity hybrid surrogate model with subdominant modes. VIJAY VARMA, MARK SCHEEL, JONATHAN BLACKMAN, MATT GIESLER, Caltech, SXS COLLABORATION — The era of gravitational wave (GW) astronomy has been emphatically unveiled with the recent detections by LIGO. The mergers of binary black holes (BBHs) were and continue to be one of the most promising sources of GWs. To maximize the science potential of these and future detections, accurate GW models that can reproduce all relevant physical features such as subdominant modes, precession, eccentricity, etc, are crucial. Numerical relativity (NR) simulations provide the most accurate GW waveforms but are prohibitively expensive for applications such as parameter estimation. Surrogate models of NR waveforms have been shown to be both fast and accurate in reproducing the NR waveforms. However, surrogate models constructed until now have only used the NR data, and hence don't span the entire LIGO band for stellar mass binaries. This can be remedied by hybridizing the NR waveforms using post-Newtonian (PN) / effective one body (EOB) waveforms for the early inspiral. We present an aligned-spin surrogate model for hybridized NR-PN/EOB waveforms, that spans the entire LIGO band for stellar mass binaries, includes the effects of subdominant modes and accurately reproduces the hybrid waveforms.

Vijay Varma
Caltech

Date submitted: 12 Jan 2018 Electronic form version 1.4