Abstract Submitted
for the APR15 Meeting of
The American Physical Society

Accuracy of Binary Black Hole waveforms for Advanced LIGO searches PRAYUSH KUMAR, Canadian Institute for Theoretical Astrophysics, University of Toronto, KEVIN BARKETT, California Institute of Technology, SWETHA BHAGWAT, Syracuse University, TONY CHU, Princeton University, HEATHER FONG, Canadian Institute for Theoretical Astrophysics, University of Toronto, DUNCAN BROWN, Syracuse University, HARALD PFEIFFER, Canadian Institute for Theoretical Astrophysics, University of Toronto, MARK SCHEEL, BELA SZILAGYI, California Institute of Technology — Coalescing binaries of compact objects are flagship sources for the first direct detection of gravitational waves with LIGO-Virgo observatories. Matched-filtering based detection searches aimed at binaries of black holes will use aligned spin waveforms as filters, and their efficiency hinges on the accuracy of the underlying waveform models. A number of gravitational waveform models are available in literature, e.g. the Effective-One-Body, Phenomenological, and traditional post-Newtonian ones. While Numerical Relativity (NR) simulations provide for the most accurate modeling of gravitational radiation from compact binaries, their computational cost limits their application in large scale searches. In this talk we assess the accuracy of waveform models in two regions of parameter space, which have only been explored cursorily in the past: the high mass-ratio regime as well as the comparable mass-ratio+high spin regime.s Using the SpEC code, six q=7 simulations with aligned-spins and lasting 60 orbits, and tens of q $\in$ [1,3] simulations with high black hole spins were performed. We use them to study the accuracy and intrinsic parameter biases of different waveform families, and assess their viability for Advanced LIGO searches.

Prayush Kumar
Univ of Toronto

Date submitted: 09 Jan 2015 Electronic form version 1.4