Contribution ID: **47** Type: **not specified**

Parameter Estimation of Unmodeled Burst Gravitational Waves Using Likelihood-free Inference

Monday 10 July 2023 19:00 (2 hours)

The observed events from the LIGO-Virgo-Kagra collaboration (LVK) have been modeled sources called compact binary coalescences (CBCs). Un-modeled transients, for example, from core-collapse supernovae or pulsar glitches remain undiscovered. In this work, we demonstrate the use of likelihood-free inference using normalizing flows for parameter estimation of un-modeled burst-type gravitational-wave signals. Our framework is designed for real-time parameter estimation for generic Sine-Gaussian morphology that make minimal assumptions about the source. We show the ability of our model to accurately recover sky localization and intrinsic parameters like frequency and quality from sources embedded in real data from the LVK third observing run. The time of inference is significantly faster, and comparable in accuracy to stochastic sampling techniques, like MCMC and nested sampling, used traditionally. This is crucial in the light of increasing sensitivity of the LIGO-Virgo-KAGRA instruments requiring higher throughput especially in real-time setting.

Authors: CHATTERJEE, Deep; MARX, Ethan (MIT)

Co-authors: GUNNY, Alec; RANKIN, Dylan Sheldon (University of Pennsylvania (US)); MORENO, Eric Anton (Massachusetts Institute of Technology (US)); KATSAVOUNIDIS, Erik (MIT); GOVORKOVA, Katya (Massachusetts Inst. of Technology (US)); COUGHLIN, Michael (University of Minnesota); CHOLAYIL, Muhammed Saleem (University of Minnesota); HARRIS, Philip Coleman (Massachusetts Inst. of Technology (US)); OMER, Rafia (University of Minnesota); RAIKMAN, Ryan; BENOIT, Will

Presenter: CHATTERJEE, Deep

Session Classification: Working dinner