

# Detecting and reconstructing unmodeled gravitational waves with the BayesWave algorithm

The first and second observing runs of Advanced LIGO and Virgo reported detections of gravitational waves from several binary black holes, and one binary neutron star coalescence. As the sensitivity of our detectors improves it remains important to be able to confidently detect and characterize gravitational waves from a wide range of possible astrophysical sources. One method of searching for as-of-yet unknown signals is the BayesWave algorithm, which has been used as a followup pipeline in the first two observing runs of advanced LIGO. By modeling short-duration transient events in detector data as a sum of sine-Gaussian wavelets, BayesWave is able to robustly distinguish between real gravitational-wave events and instrumental glitches, as well as reconstruct the gravitational wave with minimal assumptions about the source of the signal. Here we discuss recent developments to the algorithm, as well as some results from LIGO's second observing run.