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An information-theoretic approach to the gravitational-wave burst detection problem[1] E KATSAVOUNIDIS, R LYNCH, S VITALE, R ESSICK, Massachusetts Institute of Technology, F ROBINET, LAL, Universit e Paris-Sud, IN2P3/CNRS, F-91898 Orsay, France — The advanced era of gravitational-wave astronomy, with data collected in part by the LIGO gravitational-wave interferometers, has begun as of fall 2015. One potential type of detectable gravitational waves is short-duration gravitational-wave bursts, whose waveforms can be difficult to predict. We present the framework for a new detection algorithm – called *oLIB* – that can be used in relatively low-latency to turn calibrated strain data into a detection significance statement. This pipeline consists of 1) a sine-Gaussian matched-filter trigger generator based on the Q-transform – known as *Omicron* –, 2) incoherent down-selection of these triggers to the most signal-like set, and 3) a fully coherent analysis of this signal-like set using the Markov chain Monte Carlo (MCMC) Bayesian evidence calculator *LALInferenceBurst* (LIB). We optimally extract this information by using a likelihood-ratio test (LRT) to map these search statistics into a significance statement. Using representative archival LIGO data, we show that the algorithm can detect gravitational-wave burst events of realistic strength in realistic instrumental noise with good detection efficiencies across different burst waveform morphologies.

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