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Ameliorating glitches in gravitational-wave searches for intermediate-mass black holes

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Interferometer data contains numerous noise transients, or “glitches”, that can mimic true gravitational waves, reducing the sensitivity of the match-filtering search by increasing the rate at which random coincidences occur. High mass binary black hole mergers are particularly susceptible since they resemble short noise transients. We show that we can use a template bank of compact binary gravitational waveforms as a probe of the frequency evolution of transients in the data. We use the GstLAL detection pipeline to produce matched-filter triggers, under the assumption that short high-mass black hole signals and glitches yield different patterns of GstLAL triggers in time and template parameter. We propose an inexpensive statistic, derived from Random Forest algorithm, based on the triggering patterns, that can easily distinguish between real events and noise, consequently increasing the significance of gravitational-wave candidates.

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