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Searching Gravitational-Wave Bursts with Space-Borne Detectors

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The millihertz gravitational wave band is expected to be opened by space-borne detectors like TianQin. Various mechanisms can produce short outbursts of gravitational waves, whose actual waveform can be hard to model. In order to identify such gravitational wave bursts and not to misclassify them as noise transients, we proposed a proof-of-principle energy excess method, that utilized the signal-insensitive channel to veto noise transients. We perform a test on simulated data, and for bursts with a signal-to-noise ratio of 20, even with the contamination of noise transient, our methods can reach a detection efficiency of 97.4% under a false alarm rate of once per year. However, more frequent occurrences of noise transients would lower the detection efficiency.

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