

Searching for gravitational wave bursts from cosmic string cusps with the Parkes Pulsar Timing Array

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Cosmic strings are one of the gravitational wave (GW) sources that can be probed by pulsar timing arrays (PTAs). In this work we develop a detection algorithm for the GW burst from a cusp on a cosmic string, and apply it to a Parkes PTA data release. We find four events with a false alarm probability less than 1%. However further investigation shows that all of these are likely to be spurious. As there are no convincing detections we place upper limits on the GW amplitude for different event durations. From these bounds, we place limits on the cosmic string tension, that are independent from other bounding techniques. Finally, we discuss the physical implications of our results and the prospect of probing cosmic strings in the era of Square Kilometre Array.

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