

Shrewd technique to knock out false-positive continuous-wave signals

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All-sky searches for continuous gravitational waves have a very high computational cost, and hence we deal with hierarchical approaches, such as the Frequency-Hough transform algorithm. The number of candidates that are typically returned by such a pipeline is quite high [$O(10^{12})$ for the [20 – 2000] Hz band before any post processing step]. To reduce this number we have deeply studied the patterns produced by these candidates in the typical search parameter space (i.e., source frequency, frequency derivatives and sky position) as a consequence of the Earth’s Doppler modulation. This has resulted in a chain of novel veto algorithms, which are useful to streamline identifying candidates that are not consistent with a continuous-wave signal. We describe the new veto chain, which we tested on data from the second advanced LIGO-Virgo observing run, and compare the outcomes against those obtained by the standard Frequency-Hough algorithm.