

## Continuous gravitational waves: Mock Data Challenge and detectability in ET

We investigate the detectability of continuous gravitational waves (CW) - weak, long-duration signals emitted by asymmetric, rotating neutron stars (NS). Despite current gravitational wave detectors not yet providing a confident detection, future instruments, notably the Einstein Telescope (ET), could move CW signals from theory to observation. Our analysis estimates the number of isolated sources that would produce detectable signals based on their signal-to-noise ratio (SNR) over specified observation time and across a range of possible ellipticities, which measure the degree of pulsar's deformation. The numerical model used in our study is built on a pulsar population synthesis within the gravitational potential of our galaxy and will be implemented as part of the ET's Mock Data Challenge (MDC).

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