Convolutional neural network search for long-duration transient gravitational waves from glitching pulsars

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We present a machine-learning search for transient continuous gravitational waves (CWs) sourced by a glitch in the Vela pulsar during the Advanced LIGO O2 observing run.

The resulting pipeline is about 80 times faster than state-of-the-art pipelines at less than a 10% loss in sensitivity.

Transient CWs are decaying CWs produced by transient deformations in neutron stars such as decaying mountains or r-modes.

Physical amplitude-evolution models are computationally prohibitive due to the unknown duration and start time of the signal.