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New method to observe gravitational waves emitted by core collapse supernovae

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Gravitational waves (GWs) have been detected from mergers of binary black holes and binary neutron stars. Core collapse supernovae (CCSNe) are recognized as the most energetic explosions in the modern Universe The main reason GWs from CCSN have not yet been detected is the low event rate, about one per century, observable within the Milky Way.

We report on the construction of a Convolutional Neural Network to focus on gravitational waves produced in one of the most dramatic events in the cosmos, supernova explosions.

We use only whitened time series of measured gravitational-wave strain as an input, and we train and test on simulated core-collapse supernovae signals in synthetic Gaussian noise representative of Advanced LIGO sensitivity. We show that our network can classify signal from noise.

Summary

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