

Title: A nonlinear analysis of Gravitational Waves from Core-collapse Supernovae

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Abstract: Core collapse supernovae, among the most energetic explosions in the modern Universe, have not been detected yet, while gravitational waves have been detected from mergers of binary black holes and binary neutron stars. To enhance the detection efficiency of such category of signals we present a nonlinear method based on convolutional neural network algorithm to extract core collapse supernova signals embedded in Gaussian noise with spectral behaviour of Advanced LIGO and Virgo detectors. Using this new approach we can classify signal from noise and identify the signal more efficiently than the algorithm currently used by the LIGO-Virgo Collaboration to search for gravitational wave transient signals.