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# Core-Collapse Supernova Waveform Generation Using Machine Learning

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Gravitational waveforms arising from core-collapse supernova are yet to be observed by the existing detectors. Simulating GW waveforms for CCSN consumes a considerable number of resources. In this work we have employed the advantage of a machine learning technique, specifically conditional variational autoencoder to generate the waveforms of the CCSN. For training, publicly available simulated waveforms are used while conditioning those on the required physical parameters. Certain equations of states were used as one of the conditioning parameters. To generate new waveforms based on the required parameters, data is sampled from the latent space distribution. This generated data corresponds to the generated waveforms. Certain metrics are employed to calculate the accuracy of the generated waveforms. Currently the generated waveforms are in agreement with the true waveforms with a mean squared value of ~0.05. This technique enables us to generate waveforms withing milliseconds using lesser resources. In future, more tests will be using more physical parameters of CCSN.

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