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Determining the EoS of neutron stars using bayesian neural networks

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Neutron stars are a remarkable object towards the study of nuclear matter properties under extreme conditions. To extract these properties, we employ Bayesian Neural Networks (BNN) that take Mass-Radius pairs observables as input. The BNN output the speed of sound squared for 15 distinct values of baryonic density energy. Our primary objective encompasses two aspects: obtaining the equation of state for neutron stars and achieving a reliable uncertainty quantification. This allows us to assess the level of confidence in our model predictions and determine if our data is free from noise. Through the implementation of BNNs, we can explore the intricate nature of nuclear matter and go further by extracting the uncertainties that come with it.

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