

Abstract Submitted
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Neural Network Solver for Multi-Component Bose Einstein Condensates¹ JOHN HEROPOULOS, SETH RITTENHOUSE, United States Naval Academy — We present an approach to using neural networks in order to find the ground state of a multi-component Bose-Einstein condensate. The variational theorem in quantum mechanics states that the energy of a trial wavefunction cannot be less than the energy of the true ground state wavefunction. We use a feed-forward neural network with a numerical grid input layer, multiple hidden layers, an output layer which is our trial wave function, and a loss function equal to the energy of the system. After iterative training, the neural network outputs the ground state wave function with an energy equal to the ground state energy of the system. We then use the Neural Network architecture to describe a 2D Bose-Einstein condensate with state dependent contact and long-range interactions.

¹Neural-Network Solver for Multi-Component Bose Einstein Condensates

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