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Nuclear liquid-gas phase transition with machine learning

Summary

The nuclear liquid-gas phase transition is an old and long-last topic. Since the interaction between nucleons exhibit Van der Waals features similar with that between molecules, thus the nuclei, considered as self-bound Fermi liquid can experience liquid-gas phase transition as well. The machine-learning techniques have already shown their capability for studying phase transitions in condensed matter physics. In this talk, I am going to introduce our recent work of using machine-learning techniques to study the nuclear liquid-gas phase transition. We demonstrate the success of these techniques, both supervised and unsupervised, in classifying the liquid and gas phase of nuclei, and determining the limiting temperature of the nuclear liquid-gas phase transition, directly from the raw experimental data of heavy-ion reactions.

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