Coupling the Lattice QCD Equation of State to the Liquid-Gas Phase Transition BORE GAO, DEBORA MROCZEK, JACQUELYN NORONHA-HOSTLER, University of Illinois at Urbana-Champaign — Van der Waals equation of state function is a fundamental formula describing systems in equilibrium. Here we use the van der Waals equation of state to simulate the liquid-gas phase transition. This liquid-gas phase transition will be mapped into a high-temperature equation of state that was reconstructed from Lattice Quantum Chromodynamics (QCD) and has a high-temperature critical point. Previously, only an ideal hadron resonance gas was used for this equation of state. In this research, we used the van der Waals equation of state formulated in the grand canonical ensemble with quantum statistics. We used the comprehensive list of particles (the PDG 16+) and adjusted the interaction terms which correspond to attractive and repulsive interactions in order to reproduce the location of the liquid-gas phase transition.

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