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Small harmonically trapped N-boson system at unitarity: Transition from N-body "Efimov" droplet to normal gas[1] YANGQIAN YAN, D. BLUME, Washington State University — Using the path integral Monte Carlo technique, we study the temperature dependence of small harmonically trapped Bose systems at unitarity. At low temperature, the system behaves like a N-body liquid droplet whose properties are tied to Efimov trimers. At high temperature, the system behaves like a gas consisting of Boltzmann particles. We observe a sharp phase-transition-like change from the droplet to the gas state in the intermediate temperature region. The energy, specific heat, and hyperradial distribution function are monitored as the system evolves from the liquid to the gas state. The connection of the phase-transition-like feature with Efimov physics will be discussed. A simple one-parameter model yields good agreement with the path integral simulation results for the entire temperature region. We use this model to predict the transition temperature for the unitary Bose gas with large number of particles.

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