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Finite-size scaling of the chemical potential of bosonic quantum fluids C.M. HERDMAN, ADRIAN DEL MAESTRO, University of Vermont — We study the finite-size scaling of the chemical potential of interacting bosonic quantum fluids using large-scale quantum Monte Carlo calculations. We consider realistic interactions for helium as well as short range repulsive interactions for bosons in one, two and three dimensions at finite temperatures. In one dimension, we compare our results to the scaling predicted by Luttinger liquid theory allowing for the identification of a parametric regime of validity for quantum linear hydrodynamics. In higher dimensions, grand canonical simulations of helium allow for the accurate computation of experimentally relevant quantities such as the chemical potential along the liquid-solid transition line at low temperatures.

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