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Quantum Monte Carlo study of a 1D phase-fluctuating condensate CHARLOTTE GILS, LODE POLLET, ETH Zurich, ALICE VERNIER, FREDERIC HEBERT, GEORGE BATROUNI, University of Nice, MATTHIAS TROYER, ETH Zurich — Starting from a microscopic description, we numerically investigate the low temperature behaviour of a trapped one dimensional Bose gas with repulsive interactions. For a sufficient number of particles and weak interactions, we identify a pronounced quasicondensate regime in temperature, where density fluctuations are negligible while phase fluctuations are considerable. In the weakly interacting limit, we find good agreement of our results with those obtained using a mean-field approximation. In addition, we study the system in parameter regimes which are beyond the accessibility of mean-field approaches. A phase-fluctuating condensate exists also in these cases, but phase-correlation properties are qualitatively different.

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