

Selected Abstracts from Other Physical Review Journals

Abstracts of papers that are published in other Physical Review journals and may be of interest to Physical Review A readers are printed below.

Short-range particle correlations in a dilute Bose gas A. Yu. Cherny A. A. Shanenko *Bogoliubov Laboratory of Theoretical Physics, Joint Institute for Nuclear Research, 141980 Dubna, Moscow Region, Russia* (Received 14 September 1999; revised manuscript received 22 March 2000)

The thermodynamics of a homogeneous dilute Bose gas with an arbitrarily strong repulsion between particles is investigated on the basis of the exact relation connecting the pair correlation function with the in-medium pair wave functions and occupation numbers. It is shown that the effective-interaction scheme, which is reduced to the Bogoliubov model with the effective pairwise potential, is not acceptable for investigating the short-range particle correlations in a dilute strongly interacting Bose gas. In contrast to this scheme, our

model is thermodynamically consistent and free of the ultraviolet divergences due to accurate treatment of the short-range boson correlations. An equation for the in-medium scattering amplitude is derived that makes it possible to find the in-medium renormalization for the pair wave functions at short boson separations. Low-density expansions for the main thermodynamic quantities are reinvestigated on the basis of this equation. In addition, the expansions are found for the interaction and kinetic energies per particle. It is demonstrated that for a many-boson system of hard spheres the interaction energy is equal to zero for any boson density. The exact relationship between the chemical potential and in-medium pair wave functions is also established. [Phys. Rev. E **62**, 1646 (2000)]