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Two-body and Three-body Contacts for Identical Bosons near Unitarity D. HUDSON SMITH, ERIC BRAATEN, Ohio State University, DAEKYOUNG KANG, MIT, LUCAS PLATTER, Argonne National Lab — In a recent experiment with ultracold trapped ^{85}Rb atoms, Makotyn et al. have studied a quantum-degenerate Bose gas in the unitary limit where its scattering length is infinitely large. We show that the observed momentum distributions are compatible with a universal relation that expresses the high-momentum tail in terms of the 2-body contact C_2 and the 3-body contact C_3. We determine the contact densities for the unitary Bose gas with number density n to be $\mathcal{C}_2 \approx 20\ n^{4/3}$ and $\mathcal{C}_3 \approx 2\ n^{5/3}$. We also show that the observed atom loss rate is compatible with that from 3-atom inelastic collisions, which gives a contribution proportional to C_3, but the loss rate is not compatible with that from 2-atom inelastic collisions, which gives a contribution proportional to C_2. We point out that the contacts C_2 and C_3 could be measured independently by using the virial theorem near and at unitarity, respectively.

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