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Universal Short Range Correlations in Bosonic Helium Clusters

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Short-range correlations in bosonic Helium clusters, composed of ^4He atoms, are studied utilizing the generalized contact formalism. The emergence of universal n -body short-range correlations, associated with the repulsive $1/r^{12}$ part of the Lennard-Jones potential, is formulated and demonstrated numerically via Monte Carlo simulations. The values of the n -particle contacts are evaluated for $n \leq 5$. In the thermodynamic limit, the two-body contact is extracted from available experimental measurements of the static structure factor of liquid ^4He at high momenta, and found in a good agreement with the value extracted from our calculations.

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