

Institute for Applied Mathematics, Bonn University

Oberseminar Stochastik

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Seminarraum LWK 0.011

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A second order upper bound for the energy of a confined gas of hard sphere bosons

We are interested in the ground state energy asymptotic of three dimensional dilute Bose gases, in physically relevant regimes. While trial states matching the leading order term were known since the influential work by Dyson in '57 (who considered hard core bosons in the thermodynamic), second order upper bounds capturing the celebrated Lee-Huang-Yang sub-leading correction to the ground state energy were so far limited to the case of particles interacting through integrable potentials.

In this talk we present new ideas allowing us to obtain a second order upper bound for a gas of N bosons confined in the three dimensional unit torus and interacting through a hard sphere potential with radius of order $1/N$ (Gross-Pitaevskii regime). We also discuss the obstructions to extending our result to the thermodynamic limit.

Based on a joint work with G. Basti, A. Olgiati, G. Pasqualetti and B. Schlein.