

Abstract

Niels Benedikter (IST Austria)

Correlation Energy of the Mean-Field Fermi Gas by the Method of Collective Bosonization

Joint with Phan Thành Nam, Marcello Porta, Benjamin Schlein and Robert Seiringer

Quantum correlations play an important role in interacting systems; however, their mathematical description is a highly non-trivial task. I explain how correlations in fermionic systems can be described by bosonizing collective pair excitations. This leads us to an effective quadratic bosonic Hamiltonian. We then establish a theory of approximately bosonic Bogoliubov transformations. Using this theory we derive a Gell-Mann–Brueckner-type formula as an upper bound for the fermionic ground state energy.