Criticality and Phase Diagram of Quantum Long-Range O(N) models

Andrea Trombettoni*[1]

[1]CNR-IOM DEMOCRITOS and SISSA – Italy

Abstract

Several recent experiments in atomic, molecular and optical systems motivated a huge interest in the study of quantum long-range spin systems. Our goal is to discuss and present a general description of their critical behavior and phases, devising a treatment valid in d dimensions, with an exponent d+σ $for the power-law decay of the couplings in the presence of an O(N) symmetry. By int$
$component quantum rotor model with long-range interactions, with N = 1 corresponding to the Ising model. The phase$
$-d planes how sa non trivial dependence on \sigma. As a consequence of the fact that the model is quantum, the correlation func$
smaller than a critical value and in this region the isotropy is not restored even at criticality. Results for the correlation length exponent, the dynamical critical exponent z and a comparison with numerical findings for them are presented.

*Speaker