



ID de Contribution: 58

Type: Talk

Recent developments in Bogoliubov Many-Body Perturbation Theory

mardi 30 mai 2017 12:20 (15 minutes)

In the recent years, so-called *ab initio* methods have know a resurgence of interest among the nuclear theory community. Recent investigations [Tichai et al., 2016] have shown that Many-Body Perturbation Theory (MBPT), when using Hamiltonians evolved through the Similarity Renormalization Group method, could provide results competing with more demanding techniques like Self-Consistent Green's Functions or Coupled-Cluster.

Recent efforts have been made to extend this formalism to Bogoliubov reference state that break the symmetry associated with the number of particle [Duguet and Signoracci, 2017]. We will here present extension of the BMBPT formalism to higher orders as well as first numerical results.

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Classification de Session: Nuclear physics - theory