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Medium effects in infinite neutron matter using in-medium similarity renormalizaton group (IM-SRG) technique SARATH SRINIVAS SARAVANAN, SUNETHRA RAMANAN, Indian Inst of Tech-Madras — Neutron matter at high density is extensively studied in the context of neutron star core. Due to high densities in the inner layers of the crust and outer layers of the core, the nucleon-nucleon interaction could be significantly altered by the medium. Such medium corrections to the interaction are an important ingredient in many body calculations such as the equation of state, pairing, etc. In this talk, we employ IM-SRG to construct a medium corrected interaction in infinite matter for a given free space interaction. IM-SRG is a continuous unitary transformation of the Hamiltonian which is normal ordered with respect to the filled Fermi level. It has the advantage of incorporating few body interactions consistently. We derive the IM-SRG flow equations by incorporating momentum conservation for a spin polarised fermion gas as a preliminary step. The solution of the flow equation at the leading order is similar to the vertex corrections encountered in many body perturbation theory (MBPT). Further, the flow equation contains terms similar to that of BCS as well as the ZS and ZS' terms from the Fermi liquid theory. We outline the set-up of the flow equations and discuss its numerical solution for infinite matter without recourse to discrete basis states.

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