Contribution ID: **20** Type: **2.Parallel session talk**

3-body induced forces due to SRG transformations

Thursday, 26 September 2024 17:00 (30 minutes)

The Similarity Renormalization Group (SRG) is a potent method explored for decoupling nuclear potentials, aimed at reducing computational demands in observable calculations. Its versatility and robustness in handling nuclear interactions offer a gateway to deeper insights into the renormalization process. These transformations, similar to the renormalization group, are typically unitary in nature, ensuring well-defined operations. Notably, they impose cutoffs on energy disparities instead of individual states, effectively removing off-diagonal matrix elements in the Hamiltonian matrix. As these cutoffs decrease, the Hamiltonian tends towards a band diagonal form.
One crucial advantage of SRG transformations is the decoupling of low-energy nuclear physics from high-energy one within the inter-nucleon interaction. This separation is pivotal for evaluating two-body observables and few-body binding energies and scattering observables like phase-shifts and scattering cross section. Simultaneously, SRG transformations induce many-body forces as it decouple the high-energy states in the Nuclear Hamiltonian. Despite its successful application in nuclear structural calculations, the SRG-transformed interaction has yet to be extensively utilized in addressing continuum problems in scattering reactions. My aim is to investigate whether employing the SRG method offers advantages in studying nuclear scattering reactions, probing its potential benefits in this domain and study the effects of these 3-body induced forces when taken into account.

Primary author: CHAHAR, Vaibhav (Jagiellonian University)

Co-author: Dr ROMAN, Skibinski (Professor, Jagiellonian University)

Presenter: CHAHAR, Vaibhav (Jagiellonian University)

Session Classification: Parallel 5：Few-nucleon systems, including QCD inspired approaches

Track Classification: Few-nucleon systems, including QCD inspired approaches