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Recent developments in the In-Medium Similarity Renormalization Group

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The ab initio description of nuclear systems has undergone a major renewal due to the use of low-resolution interactions derived from chiral effective field theory in conjunction with many-body techniques admitting for mild computational scaling [1].
Nowadays many-body practitioners are able to target systems with up to one hundred interacting particles from first principles in a systematically controllable way [2].
In this talk I present recent advances in the field of ab initio nuclear theory in the context of the non-perturbative in-medium similarity renormalization group (IMSRG) approach.
While the many-body expansion is commonly built upon a simple Hartree-Fock state, basis optimisation tools have shown to significantly improve the modelsapce convergence of the calculation [3,4]. In addition, by including three-body contributions induced by the RG flow enables for an improved many-body solution using ab initio technology [5].
Optimising the underlying reference state as well as relaxing the many-body truncation will eventually pave the way for high-precision studies in medium-mass systems.

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