Ab initio treatment of fully open-shell medium-mass nuclei with the IM-SRG

Ragnar Stroberg, Angelo Calci, Jason Holt, Petr Navratil, TRIUMF, Scott Bogner, Heiko Hergert, MSU / NSCL / FRIB, Robert Roth, TU Darmstadt, Achim Schweng, TU Darmstadt / EMMI — The in-medium similarity renormalization group (IM-SRG) is a recently-developed theoretical many-body framework which – like the coupled cluster and the self-consistent Green’s function approaches – allows for the treatment of medium-mass nuclei using interactions fit at the few-body level. I will give a brief overview of how the IM-SRG may be used to decouple a shell-model type valence space. I will then describe a recent development for the approximate treatment of residual 3N forces in the valence space which extends the reach of IM-SRG to essentially all medium-mass nuclei, and I will present some selected results spanning isotopic chains from beryllium (Z=4) to nickel (Z=28). Finally, I will discuss the consistent treatment of transition operators, highlighting the potential for future applications in electroweak physics.