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Renormalization Group Analysis of Gogny forces

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One of the most well-known methods to deal with many-body systems is the Hartree-Fock (HF) approximation. In this talk we show how the application of renormalization group (RG) techniques within the HF approximation leads to the Skyrme and Gogny forces. Unlike the application of the RG to the two-body system, where we end up with two infrared fixed points that describe weakly and strongly interacting systems respectively, here we find a unique fixed point that generate contact-range interactions that are independent of the cutoff. This leads to the reinterpretation of Gogny and Skyrme forces as renormalizable effective forces.

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