Quantum Monte Carlo calculations of 0νββ decay matrix elements

U.S. DEPARTMENT OF ENERGY | Office of Science

Theory Alliance
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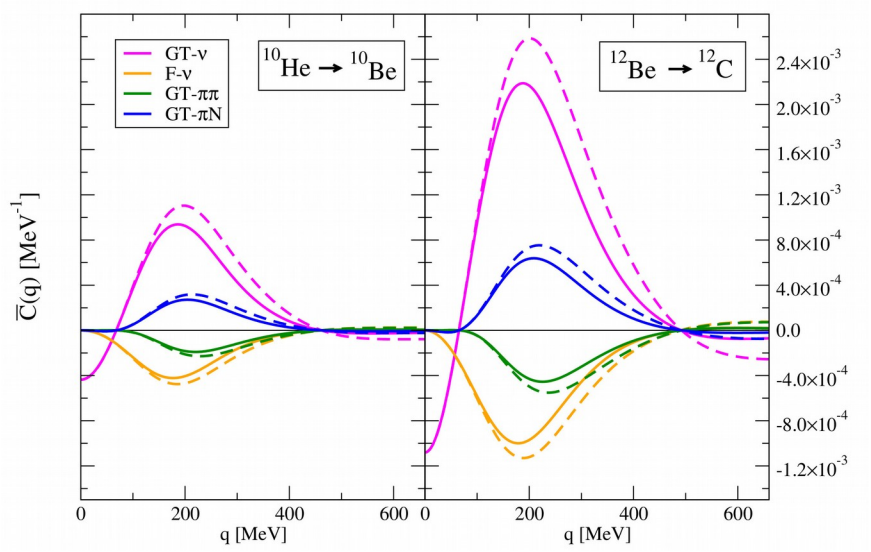
Objectives

- Evaluate neutrinoless double beta decay matrix elements in light nuclei using interactions and currents from Chiral Effective Field Theory supported by Quantum Monte Carlo methods.
- Compare with calculations based on computational methods that can be implemented to study nuclei of experimental interest, *e.g.*, ^{48}Ca, ^{76}Ge, ^{130}Te, ^{82}Se, ^{124}Sn, ^{136}Xe.

Impact

- Calculated neutrinoless double beta decay matrix elements in nuclei of experimental interest are poorly known.
- Benchmark calculations against ab initio results are required to understand the sensitivity of the calculated matrix elements with respect to variations in the adopted nuclear models and many-body computational methods.



Accomplishments

Publication: Pastore *et al. Phys.Rev. C97 (2018) 014606;* Wang *et al. (2019) under revision on Phys. Lett. B;* Cirigliano *et al. Phys.Rev.Lett. 120 (2018), 202001.*

Caption: Transition matrix densities induced by lepton number violating potentials given in momentum space for the ^{10}He→^{10}Be and ^{12}Be→^{12}C decays.