

Physics Studies

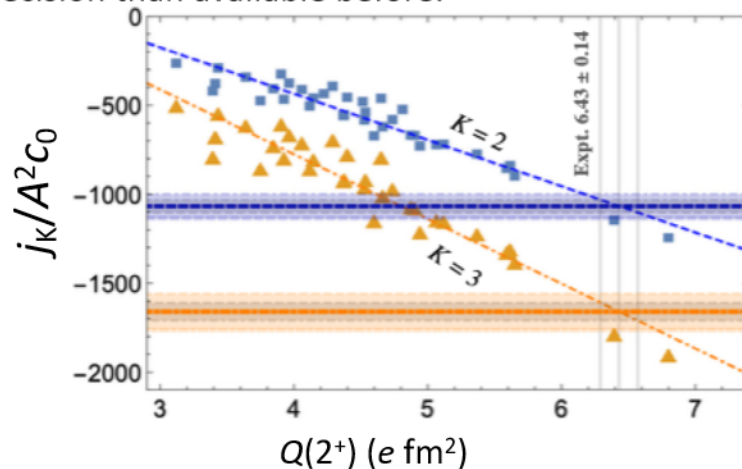
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Objectives

We calculate ${}^8\text{B}$ beta decay recoil-order terms using the *ab initio* symmetry-adapted no-core shell model (SA-NCSM) to provide a vital input to the high-precision experiments probing existence of beyond the Standard Model tensor currents in the weak interaction.

Results

We find a strong correlation between the most important recoil-order terms and the quadrupole moment of the ${}^8\text{B}$ ground state. Using this correlation, we are able to provide predictions for these recoil-order terms with significantly higher precision than available before.



Impact

- We were able to achieve the second most stringent limit to date on the tensor currents in the weak interaction thanks to our predicted recoil-order terms and the high-precision experimental measurements
- These results along with the most stringent limit from our earlier work on the mirror beta decay in ${}^8\text{Li}$ (Phys. Rev. Lett. 128, 202502 (2022)) allows for setting a tight limit on tensor current coupling to right-handed neutrinos
- Our calculated recoil-order terms are also important for studies of the conserved vector current hypothesis and second class currents

Accomplishments

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