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High Precision Half-Life Measurements for the Superaligned Fermi β^+ Emitter ^{140}O

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High precision measurements of the ft values for superallowed Fermi β decays are crucial for providing stringent tests of electroweak theory and constraining possible new physics beyond the Standard Model. To achieve this goal, ft values for these decays must be determined experimentally to $\pm 0.10\%$ or better. In this work, a high-precision half-life measurement, one of the key ingredients for determining the ft value, was performed for the superallowed Fermi β^+ emitter ^{140}O at TRIUMF's Isotope Separator and Accelerator (ISAC) facility. This work represents the first high-precision experiment using the Gamma-Ray Infrastructure for Fundamental Investigations of Nuclei (GRIFFIN) spectrometer. In this talk, I will discuss new results for the half-life of ^{140}O that were obtained by gating on 2.3-MeV γ -ray photopeaks and including corrections for detector pulse pile-up effects and dead-time losses. The results obtained will be compared to a previous high-precision half-life measurement that employed direct β counting techniques.

Keyword-1

Superaligned Fermi β decays

Keyword-2

Standard Model

Keyword-3

half-life, deadtime, pile-up

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