



Canadian Association
of Physicists

Association canadienne
des physiciens et physiciennes

Contribution ID: 3808 Type: **Oral not-in-competition (Graduate Student) / Orale non-compétitive (Étudiant(e) du 2e ou 3e cycle)**

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

Thursday 22 June 2023 08:30 (15 minutes)

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

Authors: Mr FUAKYE, Eric Gyabeng (University of Regina); Prof. GRINYER, Gwen

Co-authors: GARNSWORTHY, Adam (TRIUMF); Dr LAFFOLEY, Alex (University of Guelph (CA)); TALEBITAHER, Alireza (University of Regina); RADICH, Allison (University of Guelph); MACLEAN, Andrew (University of Guelph); JIGMEDDORJ, Badamsambuu (University of Guelph); Dr OLAIZOLA, Bruno (CERN); NATZKE, C. R (TRIUMF); SVENSSON, Carl (University of Guelph); BURBADGE, Christina; ANDREOIU, Corina (Simon Fraser University); ALI, Fuad (University of Guelph); HUBER, Garth; BALL, Gordon (TRIUMF); LONG, J (University of Notre Dame); R. LESLIE, James (Queens University); Dr SMALLCOMBE, James; WHITMORE, Kenneth (Simon Fraser University); KAPOOR, Kushal (University of Regina); Prof. LEACH, Kyle (Colorado School of Mines); DUNLOP, Michelle (University of Guelph); SAEI, Nastaran (University of Regina); BERNIER, Nikita (TRIUMF); COLEMAN, Robin; CABALLERO-FOLCH, Roger (TRIUMF); DUNLOP, Ryan; SHARMA, Shivani (University of Regina); SEKHAR BHATTACHARJEE, Soumendu (University of Regina); ZIDAR, Tammy (University of Guelph); BILDSTEIN, Vinzenz (University of Guelph (CA))

Presenter: Mr FUAKYE, Eric Gyabeng (University of Regina)

Session Classification: (DNP) R1-4 Precision Nuclear Processes and Beyond | Processus nucléaires de précision et au delà (DPN)

Track Classification: Technical Sessions / Sessions techniques: Nuclear Physics / Physique nucléaire (DNP-DPN)