



Contribution ID: 17

Type: Submitted oral (In person)

First determination of weak magnetism in the fission fragment region.

Thursday 30 November 2023 12:00 (12 minutes)

High-precision measurements of the beta spectrum shape and beta-neutrino angular correlation parameter allow to test for exotic scalar and/or tensor currents in the weak interaction. These measurements are the goal of the WISArD collaboration at ISOLDE [1]. When aiming for the highest precision in the description of the shape of the beta energy spectrum, even small Standard Model effects, usually called corrections, become important [2]. The present work focuses on one such effect, i.e., the recoil-order or hadronic correction, on the beta spectrum shape. This determination of the recoil-order correction for ^{114}In is the first within an uncharted part of the nuclear chart as, previously, weak magnetism had only been experimentally determined for specific isotopes up to $A = 75$ [3]. The determination of the weak magnetism form factor in the mass region of the fission fragments is interesting for the evaluation of the reactor neutrino anomaly [4].

This experiment has been performed by two face-to-face detectors in a high magnetic field. This effectively forms a closed system with a 4π solid angle thus mitigating the effect of backscattering, an important intrinsic limitation for other spectrum shape measurements. We will present the details of the experimental approach and report the first determination of the recoil-order correction, which is dominated by the weak magnetism form factor, on the beta energy spectrum of ^{114}In .

[1] V. Araujo-Escalona et al., Physical Review C 101, 055501 (2020).

D. Atanasov et al., NIM A 1050, 168159 (2023)

[2] L. Hayen, et al. Reviews of Modern Physics 90, 15008 (2018).

[3] N. Severijns et al., Physical Review C 107, 015502 (2023).

[4] X. B. Wang and A. C. Hayes, Physical Review C 95, 064313 (2017).

A. C. Hayes et al., Physical Review Letters 112, 202501 (2014).

Author: VANLANGENDONCK, Simon (KU Leuven (BE))

Co-authors: BLANK, Bertram; ATANASOV, Dinko (Centre National de la Recherche Scientifique (FR)); CRESTO, Federica Vera (LPC Caen - CENBG); HAYEN, Leendert; DE KEUKELEERE, Lennert; VERSTEEGEN, Maud Alice (Centre National de la Recherche Scientifique (FR)); SEVERIJNS, Nathal (KU Leuven (BE)); FLECHARD, Xavier David (Centre National de la Recherche Scientifique (FR))

Presenter: VANLANGENDONCK, Simon (KU Leuven (BE))

Session Classification: Rare Decays I