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Séminaire

PHYSIQUE NUCLÉAIRE
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Search for physics beyond the Standard Model with radioactive probes

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The search for physics beyond the standard electroweak model (SM) continues today in many forms despite its remarkable success. The reason - to find answers (new physics) for the remaining open questions such as the origin of parity violation, dark matter etc. [1]. Complementary to the searches done at high-energy (LHC), experiments with short-lived radioactive isotopes offer a large variety of nuclear states sensitive to the new physics. Studies performed in pure transitions, Fermi or Gamow-Teller, enhance the sensitivity by reducing the complexity of nuclear structure and also provide a direct probe to the hypothetical presence of scalar and/or tensor currents when examining the beta-neutrino angular correlation coefficient ($a_{\beta\nu}$) or the shape of the beta spectrum, respectively. The experiment WISArD (Weak Interaction Studies with ^{32}Ar Decay) [2] situated at ISOLDE/CERN is mainly focused on determining the magnitude of these effects. In this contribution, I would present the advantages of using beta-proton coincidences for the $a_{\beta\nu}$ measurements as well as results from a proof-of-principle experiment performed in 2018. In light of recent measurement campaign I will discuss the importance of determining the shape of the beta spectrum of ^{114}In to search for exotic tensor currents. Furthermore, a discussion about future sensitivity at reach will be given by using a purpose build detection setup.

[1] M. González-Alonso, O. Naviliat-Cuncic, N. Severijns, Prog. Part. Nucl. Phys 104, (2019) 165.

[2] V. Araujo-Escalona *et al.* Phys. Rev. C 101 p. 055501, May. 2020.