

KATRIN and the dark MSW effect - Probing neutrino interactions with a dark background field

venerdì 21 giugno 2024 17:30 (2 ore)

The KATRIN experiment aims to measure the neutrino mass by precision spectroscopy of tritium β -decay. Recently, KATRIN has improved the upper bound on the effective electron-neutrino mass to $0.8 \text{ eV}/c^2$ at 90% confidence level [1] and is continuing to take data for a target sensitivity of better than $0.3 \text{ eV}/c^2$.

In addition to a non-zero neutrino mass, there are other tensions in the neutrino and dark matter sector that call for an extension of the Standard Model. Interactions between neutrinos and dark matter could potentially resolve several of these tensions, and there are hints of their existence [2]. This contribution takes a closer look at the dark MSW effect [3] as a possible interaction mechanism, which modifies the dispersion relation of the neutrinos through interaction with a dark background field. The ultra-precise measurement of the tritium β -spectrum at KATRIN could reveal unique signatures of these modifications.

This poster provides an introduction to the dark MSW effect and its impact on the β -spectrum. First sensitivity estimates and an outlook on the dark MSW searches with KATRIN are discussed.

[1] KATRIN Collab., Nat. Phys. 18, 160–166, 2022.

[2] D. Hooper, M. Lucca, Phys. Rev. D 105, 103504, 2022.

[3] G. Huang, W. Rodejohann, Nucl. Phys. B 993, 116262, 2023.

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Classificazione della track: Beyond Standard Model searches in the neutrino sector