Phenomenology 2025 Symposium



Contribution ID: 84

Type: not specified

Unveiling the Neutrino Magnetic Moment: Constraints from Colliders

Monday 19 May 2025 17:15 (15 minutes)

The transition magnetic moment between active and sterile neutrinos is theoretically well-motivated scenario beyond the Standard Model, which can be probed in cosmology, astrophysics, and at terrestrial experiments. In this talk, we focus on the latter by examining such an interaction at proposed lepton colliders. Specifically, in addition to revisiting LEP, we consider CEPC, FCC-ee, CLIC, and the muon collider, motivated by the potential realization of any of them. Within the effective field theory framework, we present parameter regions that can be probed, highlighting the dependence on the lepton flavor interacting with the sterile neutrino. By including several new processes with large sterile neutrino production cross sections at high-energy lepton colliders, we find that the expected sensitivity for the active-to-sterile neutrino transition magnetic moment can reach $d_{\gamma} \simeq \mathcal{O}(10^{-7}) \text{ GeV}^{-1}$.

Mini Symposia (Invited Talks Only)

Plenary (Invited talks only)

Authors: Mr MIR, Samiur R. (Oklahoma State University); BRDAR, Vedran (Oklahoma State University (US)); Prof. LI, Ying-Ying (Institute of High Energy Physics, , Chinese Academy of Sciences); Mr WANG, Yi-Lin (Interdisciplinary Center for Theoretical Study, University of Science and Technology of China)

Presenter: Mr MIR, Samiur R. (Oklahoma State University)

Session Classification: Neutrino

Track Classification: Neutrino Physics