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Electromagnetic Properties of Neutrinos: Past, Present and Future

Friday, July 14, 2023 10:00 AM (45 minutes)

After a brief introduction to neutrino electromagnetic properties, I will focus on the correlation between neutrino magnetic moment and neutrino mass mechanism. Then I will discuss that the models that induce large neutrino magnetic moments while maintaining their small masses naturally also predict observable shifts in the charged lepton anomalous magnetic moment by showing that the measurement of muon $g-2$ by the Fermilab experiment can be an in-direct and novel test of the neutrino magnetic-moment hypothesis, which can be as sensitive as other ongoing-neutrino/dark matter experiments. Such a correlation between muon $g-2$ and the neutrino magnetic moment is generic in models employing leptonic family symmetry to explain a naturally large neutrino magnetic moment. The promising new possibilities for probing neutrino electromagnetic properties in future experiments from terrestrial experiments and astrophysical considerations will also be discussed. This talk will be based on results obtained in hep-ph 2203.01950, 2007.04291, 2104.03291, and 2303.13572.

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