

Constraining the electromagnetic multipoles of sterile neutrinos

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Sterile neutrinos with masses below the keV scale might interact with standard model leptons via electromagnetic multipoles. While the electromagnetic interactions of active neutrinos are, either predicted to be very small, or strongly constrained by observations, the electromagnetic interactions of sterile neutrinos are orders of magnitude less constrained, and the predictions are model dependent. In this work, we derive novel constraints on the diagonal anapole and magnetic moment of sterile neutrinos, from the non-observation of an excess of events due to solar sterile neutrinos scatterings with electrons at the XENON1T experiment. Furthermore, we discuss a model in which the sterile neutrinos acquire enhanced electromagnetic multipoles that can be testable with current and near future experiments.

Orateur: HERRERA, Gonzalo (TUM, MPP)

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