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Quasi-sterile neutrinos at long-baseline oscillation experiments

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Sterile neutrinos may be part of a quasi-hidden sector that interacts with Standard Model particles via a heavy mediator. In the case where two (or more) sterile neutrinos have a flavor-changing coupling to a new boson which also couples to nucleons, the heavier state N_2 may decay into the lighter state N_1 and a pair of Standard Model particles. If the mass difference between the sterile neutrinos is large enough, the $N_2 \rightarrow N_1 \pi^+ \pi^-$ process can lead to striking signatures at neutrino detectors. In particular, the light sterile neutrino may be produced through oscillations and then up-scatter creating a pion pair in the detector which is displaced from a DIS event.

Experimental Collaboration

theory

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