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Contribution ID: **202** Type: **not specified**

TALK: eV Sterile Neutrino Paradox

Wednesday, July 17, 2024 3:00 PM (45 minutes)

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Light sterile neutrinos are frequently featured in various theories, particularly to explain short-baseline anomalies or as candidates for dark matter. These scenarios necessitate non-zero mixing with active neutrinos, often disregarding the contributions to the active neutrino mass matrix. We demonstrate that this mixing induces contributions to the active neutrino mass matrix, thereby affecting neutrino oscillation results. We conduct a rigorous analysis and present stringent bounds on these induced masses for each entry of a active neutrino mass matrix. Furthermore, we examine whether the induced matrix can elucidate the distinctive pattern of lepton mixing and the neutrino mass spectrum, while discussing the various phenomenological implications.

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