

PRISMA+ Colloquium

July 12, 2023 at 1 p.m.
Lorentz-Raum, 05-127, Staudingerweg 7

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Status of eV sterile neutrino oscillations and recent developments in reactor and gallium neutrino experiments

In this talk the referent reviews the recent status of the hypothesis of sterile neutrinos with masses in the eV range, motivated by oscillation searches at short baselines. Indications for muon to electron neutrino transitions from the LSND and MiniBooNE experiments are in severe tension with constraints from disappearance experiments. Previous hints for electron neutrino disappearance at short-baseline reactor experiments are neither confirmed by recent data (among others from the STEREO experiment) nor supported by updated reactor flux determinations. However, previous indications from radio-active source experiments in gallium detectors have been recently confirmed by the BEST collaboration, which observes a neutrino-induced count rate about 20% lower than expected at about 5 sigma significance. However, an explanation in terms of sterile neutrinos is in strong tension with other constraints. If any of these anomalies is due to new physics, most likely more ingredients than sterile neutrino oscillations are required. The referent will comment on possible explanations of the gallium anomaly in terms of quantum decoherence.