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Latest KATRIN results on neutrino mass and sterile neutrino search.

Neutrinos are known to have non-zero masses, as shown by oscillation observations, but their absolute mass scale remains unknown. Observational cosmology and neutrinoless double beta decay experiments derive sub-eV upper limits. Complementing these efforts with a model-independent approach based on beta-decay kinematics, the Karlsruhe Tritium Neutrino (KATRIN) experiment provides the most direct bound at 0.45 eV/cˆ2 (90% CL). The ongoing data-taking targets a sensitivity of better than 0.3 eV. The experiment combines a high-intensity gaseous tritium source with high-resolution spectroscopy of the molecular tritium beta decay spectrum. KATRIN also explores the potential for eV-scale sterile neutrinos, complementary to short-baseline neutrino oscillation experiments. The analysis of five KATRIN science runs highlights the experiment's sensitivity to a fourth mass eigenstate \(m_{4}\) up to 40 eV and an active-to-sterile mixing amplitude \(|U_{e4}|ˆ2 \leq 0.5\). This talk discusses the improved bounds on the neutrino mass from analyzing 25\% of the KATRIN data and details on sensitivity to light sterile neutrinos

Track type

Neutrino Physics

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