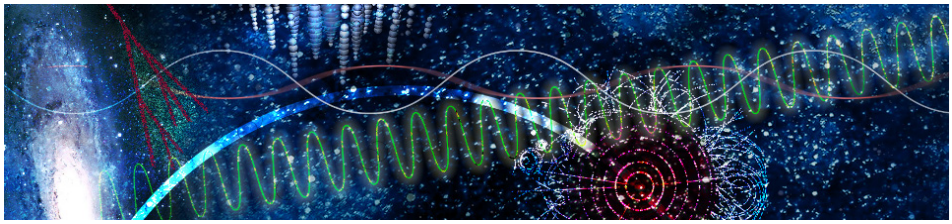

Contribution ID: **13** Type: **Poster**

Seach for light sterile neutrino with KATRIN

The KArlsruhe TRItium Neutrino (KATRIN) experiment is designed to determine the mass of the electron antineutrino by kinematic measurements of the tritium beta-decay with a target sensitivity of 0.2 eV/c^2 (90\% C.L.). In 2022, KATRIN reported the most stringent limit on the neutrino mass with $m_\nu < 0.8$ eV/c^2 (90\% C.L) based on data acquired during the first two science runs of 2019. Along with the neutrino mass determination, the precise measurement of the beta-decay spectrum near the kinematic endpoint allows KATRIN to search for a nonstandard or sterile neutrino with masses in the eV range.

The fourth neutrino mass-eigenstate introduces an additional branch into the tritium β-spectrum which manifests as a kink in the differential spectrum. The position and amplitude of this kink correspond to the sterile neutrino mass m_4 and effective mixing angle $\sin^2(\theta) = |U_{e4}|^2$, respectively. In this work sensitivity studies to light sterile neutrinos based on new science runs and the effect of systematic uncertainties are presented. The obtained sensitivity is compared to current results and anomalies in the field of light sterile neutrinos and further plans are reported.

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Session Classification: Poster Session