



Contribution ID: 179

Type: **Poster**

TRISTAN: A novel detector for searching keV-sterile neutrinos at the KATRIN experiment

Monday 28 August 2023 18:43 (1 minute)

Sterile neutrinos are a possible extension of the Standard Model of particle physics. If their mass is in the keV range, they are a suitable dark matter candidate. One way to search for sterile neutrinos in a laboratory-based experiment is via tritium beta decay. A sterile neutrino with a mass up to 18.6 keV would manifest itself in the decay spectrum as a kink-like distortion.

The Karlsruhe Tritium Neutrino (KATRIN) experiment currently investigates the endpoint region of the tritium beta-decay spectrum to measure the effective electron anti-neutrino mass. The main objective of the TRISTAN project is to extend this energy range to measure the entire beta-decay spectrum. To this end, a novel multi-pixel silicon drift detector and readout system is currently being developed which enables the search for sterile neutrinos in the keV-mass range. This contribution will give an overview on the design and development of the new detector and show first test measurements of a detector module.

This work is supported by BMBF (05A17PM3, 05A17PX3, 05A17VK2, 05A17WO3), KSETA, the Max Planck society, and the Helmholtz Association. Moreover, this project has received funding from the European Research Council (ERC) under the European Union Horizon 2020 research and innovation program (grant agreement no. 852845).

Submitted on behalf of a Collaboration?

Yes

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Session Classification: Poster session

Track Classification: Neutrino physics and astrophysics