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Type: Talk

Pushing the Frontier in Measuring the Mass of the Lightest Lepton: Results from the Karlsruhe Tritium Neutrino Experiment

Tuesday 8 September 2020 11:00 (25 minutes)

The determination of the neutrino mass is one of the major challenges in particle physics today. Experiments, based solely on the kinematics of β -decay, provide a largely model-independent probe to the neutrino mass scale. The Karlsruhe Tritium Neutrino (KATRIN) experiment is designed to directly measure the effective electron antineutrino mass with a sensitivity of 0.2 eV (90% CL). It employs a cryogenic, highly pure, molecular tritium source providing a high luminosity of signal electrons. It is coupled to a high-resolution, integrating spectrometer for energy analysis. In this talk we present the principle of the measurement as well as how it was technically realised in a 70-m long beamline. Subsequent to a sequence of commissioning measurements, in 2019 the first neutrino mass run took place which will be discussed in detail. Our blind analyses allowed us to set an upper limit of 1.1 eV on the neutrino-mass scale at a 90% confidence level. This first result, based on a few weeks of running at a reduced source intensity and dominated by statistical uncertainty, improved on prior limits by nearly a factor of two. Finally, the talk will conclude with an outlook on future neutrino mass campaigns and on studies aiming to probe new physics theories (like sterile neutrinos) from the recorded high-resolution tritium β -spectra.

Is this abstract from experiment?

Yes

Internet talk

Yes

Name of experiment and experimental site

Karlsruhe Tritium Neutrino Experiment (KATRIN) at the Karlsruhe Institute of Technology (KIT), Germany

Is the speaker for that presentation defined?

Yes

Details

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