Contribution ID: **397** Type: **Invited Presentation**

Neutrino mass measurements with KATRIN and atomic source development for future experiments

From the observation of oscillations, neutrinos are known to have a mass. However, it remains an open question as to how large that mass is. One way of determining the neutrino mass is the investigation of weak decay kinematics. Especially suited is the beta decay of tritium, mainly due to its simple structure, high activity, and comparatively low endpoint value.

KATRIN, the Karlsruhe Tritium Neutrino Experiment, measures the imprint of the neutrino mass on the endpoint region of the tritium beta-decay spectrum. KATRIN sets the most stringent upper limit on the neutrino mass, at a value of below 0.45 eV (90% CL), and its final sensitivity will be below 0.3 eV.

To go beyond KATRIN, future experiments will require improvements in detector technology. This is currently being investigated in the form of e.g. time-of-flight techniques and quantum sensors. Once significant advancements in this area are made, however, the molecular tritium source will become a limiting factor. An atomic tritium source will therefore be needed.

Such an atomic source can be implemented by trapping mK-cold atoms in a magnetic field. Within the Karlsruhe Mainz Atomic Tritium Experiment (KAMATE), the production and cooling of tritium atoms is being studied.

The talk will present the current KATRIN results and provide an overview of the ongoing efforts for the development of an atomic tritium source within KAMATE and beyond.

Author: RODENBECK, Caroline (Karlsruher Institut für Technologie)

Presenter: RODENBECK, Caroline (Karlsruher Institut für Technologie)

Session Classification: Nuclear Astrophysics, Astroparticle Physics and Synergies with Nuclear Physics

Track Classification: Astroparticle Physics and Synergies with Nuclear Physics