



Contribution ID: 88

Type: **Afternoon Session**

Neutrino mass determination

Friday 21 April 2017 17:00 (15 minutes)

The absolute neutrino mass scale is one of the big open questions in particle physics, astrophysics and cosmology. Different experimental approaches are currently pursued to answer this question. Cosmological observations and neutrinoless double beta decay experiments provide an indirect access to the absolute neutrino mass scale, but are model-dependent. Model independent, direct ways to measure the neutrino mass are the investigation of the kinematics of single beta decay via a precise measurement of the beta decay electron energy spectrum close to the endpoint, or the detailed study of the electron capture spectrum.

This talk will present the status of different experiments aiming to measure the neutrino mass using the above mentioned methods. The emphasis will be on the Karlsruhe TRitium Neutrino experiment (KATRIN) which aims to determine the effective electron anti-neutrino mass with an unprecedented sensitivity of $200 \text{ meV}/c^2$ at 90% CL via precision beta-decay spectroscopy of molecular tritium near its kinematic endpoint at 18.6 keV.

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Session Classification: Friday Afternoon

Track Classification: Flavor Physics of Quarks and Leptons