



## Poster session 4 – Friday 8 July

### P4.043 Neutrino mass analysis strategy for the Karlsruhe Tritium Neutrino Experiment (KATRIN)

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*on behalf of KATRIN collaboration*

Neutrino properties, and in particular the yet undetermined absolute scale of neutrino rest masses, bear fundamental relevance to many current research topics in cosmology, theoretical particle physics and astroparticle physics. Precision measurements of the kinematics of weak decays represent the only model independent approach to resolve the extremely small absolute neutrino mass scale in a laboratory experiment. The most mature technique up to date relies on the spectroscopy of tritium beta decay near its kinematic endpoint at 18.6 keV.

The Karlsruhe Tritium Neutrino experiment (KATRIN) aims to improve the neutrino mass sensitivity obtained through this method by an order of magnitude to  $200 \text{ meV}/c^2$  (90% C.L.). To this end, KATRIN utilizes an ultra-luminous molecular gaseous tritium source, a differential and a cryogenic pumping section, a tandem of two high-resolution electrostatic spectrometers of MAC-E filter type, and a multi-pixel silicon semiconductor detector. The experiment is currently in its final construction and commissioning phase at the Karlsruhe Institute of Technology in Germany.

This contribution presents an overview of KATRIN's neutrino mass analysis strategy. We focus on the probabilistic model, which is essential in performing a multi-parameter fit to the observed beta spectrum shape. It involves a quantitative understanding and accurate modelling both of the theoretical beta-decay spectrum and the experimental response function. Closely related topics, like the choice of KATRIN's operational parameters and measurement point distribution, as well as planned beyond-SM parameter searches, are also discussed.