



TECHNISCHE  
UNIVERSITÄT  
DARMSTADT

## Fachbereich Physik

Institut für Physik  
Kondensierter Materie  
Prof. Dr. Benno Liebchen

Institut für Kernphysik  
Prof. Ph. D. Achim Schwenk

# Physikalisches Kolloquium

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<b>Title:</b>	<b>KATRIN: new result and future perspectives</b>
<b>Speaker:</b>	<b>Prof. Dr. Susanne Mertens, Max-Planck-Institut für Kernphysik (MPIK) in Heidelberg</b>
<b>Date &amp; time:</b>	<b>Friday 27.06.2025, 2 pm</b>
<b>Location:</b>	<b>ZKS-Uhrturmhörsaal, S2 08, R. 171, Hochschulstraße 4</b>
<b>Host:</b>	<b>Prof. Dr. Achim Schwenk</b>

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## Abstract:

The absolute neutrino mass scale remains one of the most pressing open questions in astroparticle physics.

The most direct method to assess the absolute neutrino mass is through the kinematics of single beta decay, where the neutrino mass reveals itself as a tiny spectral distortion near the endpoint.

The KATRIN experiment is designed to probe this effect this by combining a high-intensity gaseous tritium source with a high-resolution spectrometer. Recently, KATRIN reported a new world-leading upper limit of  $m < 0.45$  eV (90% CL), based on its first five measurement campaigns.

In 2026, following the completion of its neutrino mass data-taking phase, KATRIN will upgrade its beamline with a novel detector system known as TRISTAN. This detector will enable measurements of the full tritium beta-decay spectrum, opening the door to searches for keV-scale sterile neutrinos.

In this talk, I will present KATRIN's latest results and outline its future prospects.

