

Einladung zum Physikalischen Kolloquium

11.07.2025 **Kolloquium aus Anlass des 60. Geburtstages von Marc Weber**

Grußworte:

Oliver Kraft *Vizepräsident für Forschung, Lehre und Akademische Angelegenheiten*

Guido Drexlin *Dekan der KIT-Fakultät für Physik*

Frank Simon *Leiter des Instituts für Prozessdatenverarbeitung und Elektronik*

Fachvortrag:

Christian Weinheimer, Universität Münster

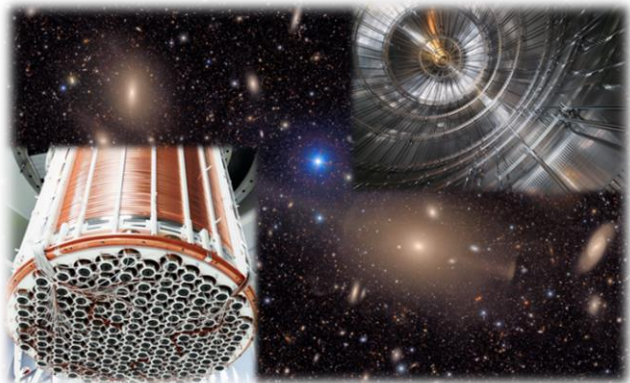
»Advanced techniques for neutrino mass and dark matter searches«

Einführung und Programm: Guido Drexlin und Markus Klute

Abstract: The next generation of experiments is currently being prepared, which should enable significant steps forward in the sensitivity of direct searches for neutrino mass (ECHO, KATRIN++, etc.) and dark matter particles in our Milky Way (XLZD). These experiments are not only extremely exciting from a scientific point of view, but also extremely challenging from a technological perspective.

The strategy for making neutrino mass searches even more sensitive is to use differential spectral measurements. This will be made possible by sophisticated quantum sensors or other quantum technologies. The KATRIN++ concept, based on the existing KATRIN infrastructure, aims to achieve the highest precision by using an atomic tritium source in addition, instead of the current molecular source. The search for very light candidates for dark matter also benefits from quantum technology, while the search for heavier particles, such as WIMPs, primarily requires an increase in detector mass. However, maintaining the extremely low energy threshold while limiting the background rate to essentially unavoidable sources such as solar and atmospheric neutrinos poses many challenges for the future XLZD observatory.

This lecture will present the major scientific questions in this field, as well as the major technological challenges and exciting approaches to solving them. The KATRIN++ project and the XLZD dark matter and neutrino observatory will be used as examples, with frequent reference to the existing technical solutions used in the KATRIN experiment.



Der Vortrag findet **am Freitag, den 11. Juli 2025 um 17:00 Uhr** im **Otto-Lehmann-Hörsaal**, Physik-Flachbau (Geb. 30.22), KIT-Campus Süd statt.