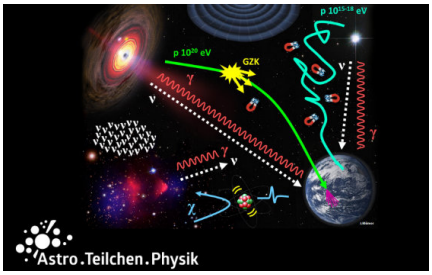

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KATRIN++ - Development of New Detector Technologies for Future Neutrino Mass Experiments with Tritium

Wednesday, October 16, 2024 6:23 PM (2 minutes)

Currently, the tightest constraints on the absolute scale of neutrino mass are obtained by the KATRIN (KArlsruhe TRItium Neutrino) experiment, giving an upper limit on the mass of electron anti-neutrino of 0.45 eV (https://doi.org/10.48550/arXiv.2406.13516). Final projected sensitivity of the KATRIN experiment will be in the vicinity of 0.3 eV, and should be reached at the end of 2025.
Going beyond this limit, and eventually fully excluding inverted mass ordering, will be the task for future neutrino mass experiments. In this regard, development of new detector technologies is of utmost importance, with quantum sensor arrays currently being the front runners due to their exceptional performance and excelent energy resolution.
We report on our R&D efforts aiming to demonstrate the feasibility of developing and operating large quantum sensor array for detection of external electrons in a KATRIN-like setup, as a basis for the next generation neutrino mass experiments with tritium. We present the results of our first measurement campaigns with ^{83m}Kr, serving as a proof of principal measurements for ultra-high resolution electron spectroscopy with metallic microcalorimeters, and discuss our strategy for the future.

Summary

Authors: KOPMANN, Andreas (KIT); BORNSCHEIN, Beate (Karlsruhe Institute of Technology, Institute for Astroparticle Physics); ADAM, Fabienne; GLÜCK, Ferenc (KIT IKP); SIMON, Frank (KIT IPE); VALERIUS, Kathrin (Karlsruhe Institute of Technology); Dr SCHLÖSSER, Magnus (Tritium Laboratory Karlsruhe - Institute of Astroparticle Physics); LANGER, Marie Christine (Institute of Micro- and Nanoelectronic Systems (IMS), Karlsruhe Institute of Technology (KIT)); STEIDL, Markus (Karlsruhe Institute of Technology); MÜLLER, Michael; KOVAC, Neven (Institute for Astroparticle Physics, Karlsruhe Institute of Technology); Dr SACK, Rudolf (Karlsruhe Institut für Technologie); KEMPF, Sebastian (Institute of Micro- and Nanoelectronic Systems); HEYNS, Svenja; GIL, Woosik (KIT, IAP)

Presenter: KOVAC, Neven (Institute for Astroparticle Physics, Karlsruhe Institute of Technology)

Session Classification: Poster session leading into social dinner buffet