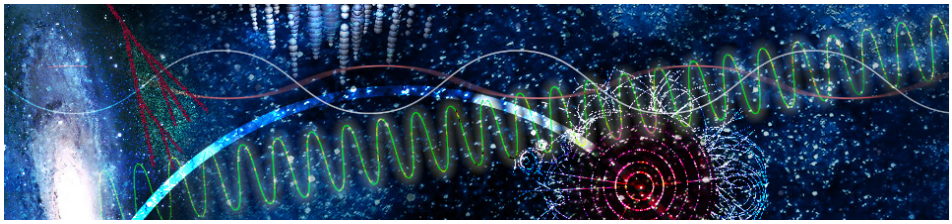

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Integration of KATRIN research infrastructure in research oriented teaching (RIRO)

The KATRIN experiment at KIT Campus North aims to determine the neutrino mass with unpresedented sensitivity by measuring the shape of the energy spectrum of electrons from tritium-beta-decay close to the spectral endpoint. The 70-m-long setup includes a gaseous window-less tritium source, a beamline with differential and cryogenic pumping and a spectrometer section with two electro-static high-pass filters, so-called MAC-E-filters. The technically challenging setup includes ultra-high vacuum, superconducting magnets, cryogenics, tritium handling, precision high voltage, solid-state detectors, tritium processing, as well as many different calibration and monitoring techniques.
Funded by the ExIni project RIRO (Reasearch Infrastructure in Research-Oriented teaching) at KIT, several aspects of the KATRIN-related technologies have been made available to physics master studends in various lab course experiments.
In the first project a muon telescope with several square meters of plastic scintillator have been installed above and below the 10-m-diameter main spectrometer, allowing to look for correlations between throughgoing muons and background in KATRIN.
The second projects involves the operation of a scaled-down (1:20) complete MAC-E filter with implanted Kr-83m and tritium sources. This experiment allows the measurement of the integral energy spectrum of both sources by varying the retarding voltage of the spectrometer and counting the electrons with a 7-pixel silicon drift detector.
The third project offers a 1-week lab course introducing varios spectrometric techniques (Laser Raman and IR spectroscopy) used at the Tritium Laboratory Karlsruhe (TLK) to determine the concentration of hydrogen isotopologues in a gas mixture and measurements with the monitor spectrometer of the KATRIN experiment.
Up to now, the RIRO funded projects at KATRIN led to five bachelor theses and one master thesis.

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