

Application note:

Demagnetization KATRIN-Hall, KIT

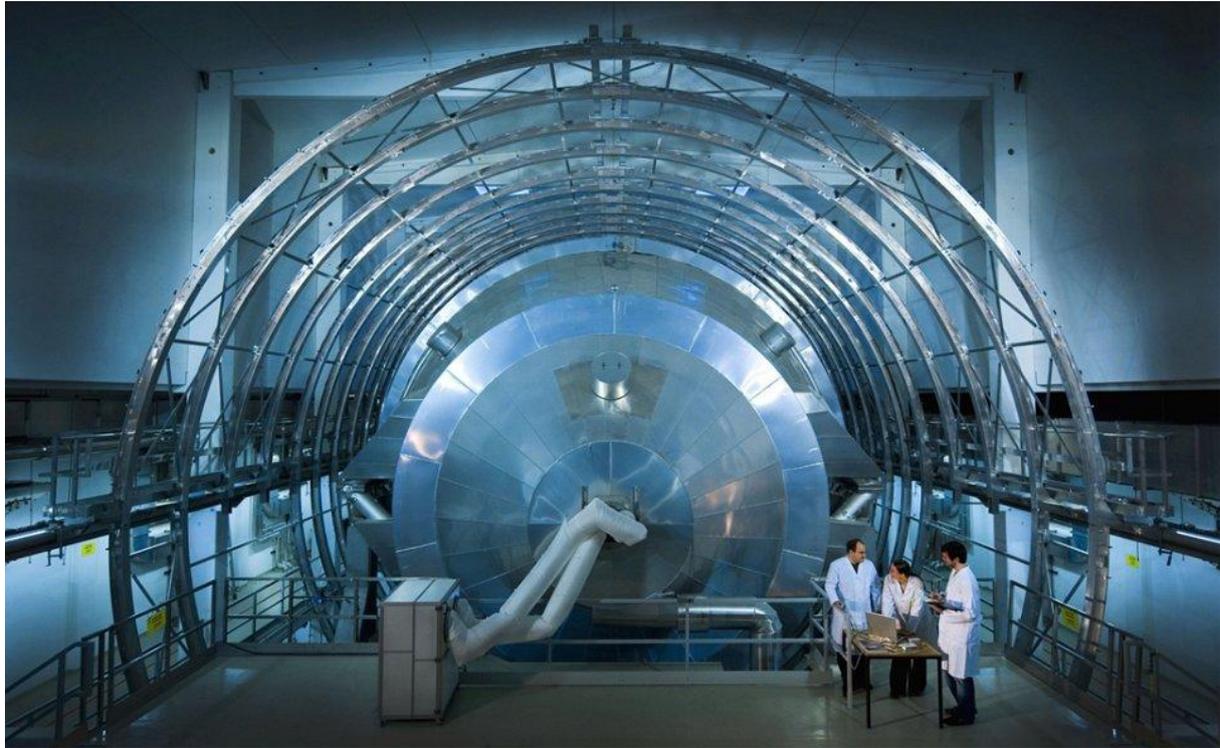


Bild: KIT

The Karlsruhe Tritium Neutrino (KATRIN) experiment is an international collaboration of research institutes located at the Karlsruhe Institute of Technology (KIT). Its objective is to solve one of the greatest mysteries in physics: What is the absolute mass scale of neutrinos?

Neutrinos are one of the fundamental particles which make up the universe. They are also one of the least understood. Only a few years ago it was proven that they actually have a mass.

In the experiment Neutrinos are generated by tritium beta decay with protons and electrons. The high-energy electrons are guided over 70 meters in ultra-high vacuum by strong magnetic fields onto a detector. Through accurate measurement of the electrons' kinetic energy by a spectrometer an estimation of the neutrino's mass is possible. KATRIN is 10 times more accurate than previous experiments.

The high sensitivity of this setup requires a low and uniform external magnetic field within the range of the spectrometer. Thus, in the immediate vicinity of the spectrometer non-magnetic steel reinforcements were installed. The ferromagnetic steel reinforcements of the enveloping building further away were identified by scientists as a disturbance.

By alternating field pulse demagnetization with high field strength (Maurer Degaussing technology) the residual magnetism could be equalised and reduced by a factor of more than 4. Near the walls values lower than the earth's magnetic field were measured. The extent of the effect on the sensitivity of the demagnetization on the detector will be determined within the coming months.

The Maurer Magnetic team wishes all the best.



Pulse demagnetization of the KATRIN hall (30x20x15m) with the mobile power module MM DM200-PC and flexible demagnetization cables K8/10-30. The two teams required about 20 hours for demagnetization of the critical areas.



Maurer Magnetic AG is a producer of demagnetizers, measuring instruments for residual magnetism, demagnetization services, troubleshooting and training in magnetism.

More information about KATRIN: www.katrin.kit.edu

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