



Contribution ID: 52

Type: **Oral**

The Ultra-Cold Neutron Source at the FRM-II

Monday, 11 October 2010 17:15 (15 minutes)

A new strong source for the production of ultra-cold neutrons (UCN) is currently built up at the FRM-II. It will be installed at the horizontal beam tube SR-6, with a solid hydrogen pre-moderator and a solid deuterium UCN-converter located approx. 60 cm away from the reactor fuel element. UCN are produced inside the solid deuterium via the superthermal principle of conversion of the pre-cooled neutrons coming from the solid hydrogen. The UCN will be extracted from the converter and guided through the biological shield to several experiments located inside the experimental halls of the FRM-II. These experiments are investigating fundamental properties of the free neutron, such as its lifetime, a possible electric dipole moment or the quantum mechanical interaction of neutrons with the earth's magnetic field. The expected UCN densities in the experiments will be 2-3 orders of magnitude higher than the densities reached at the currently strongest UCN-source located at the ILL. This talk will give an overview of the setup of the UCN source at the FRM-II and of the connected experiments. The current status of the project and future developments will be presented.

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Session Classification: Session Mo - 4

Track Classification: Advanced ultracold neutron sources