UNI FREIBURG
Physikalisches Institut
Fakultät für Mathematik und Physik
Albert-Ludwigs-Universität Freiburg

# SONDERKOLLOQUIUM

AM 4. NOVEMBER 2014 UM 12:30 UHR

IM SEMINARRAUM DES GUSTAV-MIE-HAUSES

The XENON1T cryostat, under construction in its 10m water tank

## Identifying Dark Matter: The XENON Project

PROF. DR. RAFAEL LANG

*PURDUE UNIVERSITY*

*INDIANA, USA*

There is ample cosmological and astrophysical evidence for the existence of Dark Matter, but its nature remains unknown. Dark Matter thus provides the most distinct indication for new physics beyond the standard model of particle physics. The most popular hypothesis states that, just like protons and neutrons, Dark Matter particles are relics from the thermal history of our Universe, with their mass expected to be about the mass of a whole atom. Multiple probes are available to detect such particles. Among these, direct search experiments looking for Dark Matter particles that scatter off a laboratory target show rapid progress and exhibit most promising perspectives. The XENON project spearheads this direct search. The next-generation XENON1T detector in particular will use a total of 3200kg of ultra-pure xenon, realizing a target with an unprecedented low background and well-studied systematics. Data taking will start in 2015 for a sensitivity that is two orders of magnitude beyond today's best limits. XENON1T will probe the most promising parameter space for thermal relic particles, thus providing an exciting opportunity to unravel one of Nature's biggest mysteries.