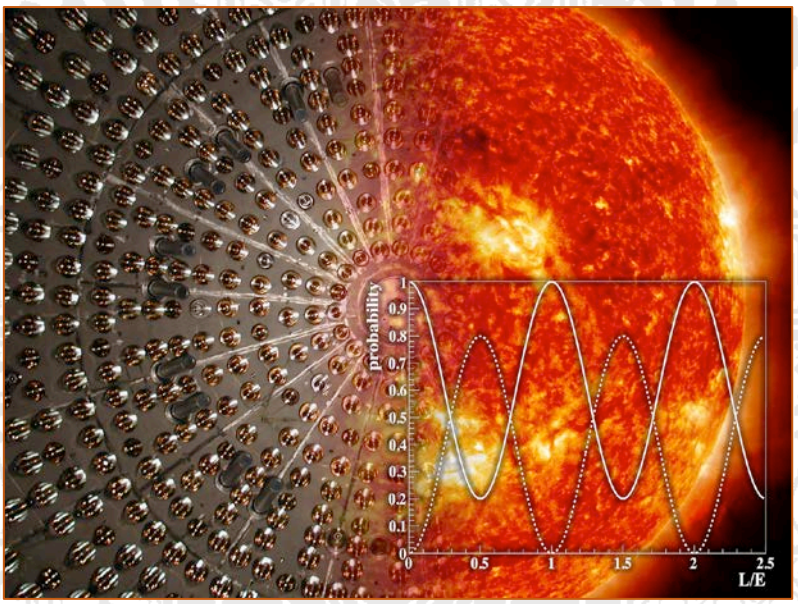
Physikalisches Institut
Fakultät für Mathematik und Physik
Albert-Ludwigs-Universität Freiburg

SONDERKOLLOQUIUM

AM 5. NOVEMBER 2014 UM 9:00 UHR

IM SEMINARRAUM DES GUSTAV-MIE-HAUSES



Results and Prospects of Low-Energy Neutrino Experiments

PROF. DR. MICHAEL WURM

JOHANNES GUTENBERG UNIVERSITÄT, MAINZ

The discovery of neutrino oscillations has created a rapidly evolving field of research aiming at the experimental determination of oscillation parameters as well as the search for novel oscillation effects. Low-energy neutrino and in particular large-volume liquid-scintillator detectors play a significant role in these efforts: Spectroscopic measurements of reactor neutrinos in Double-Chooz and of solar neutrinos in the Borexino experiment have greatly added to the establishment of the three-flavor oscillation picture. The currently prepared short-baseline oscillation experiment SOX is expected to provide a final confirmation or rejection of the experimental hints suggesting an additional fourth, sterile neutrino flavor. On a more long-term perspective, subtle effects in the neutrino oscillation pattern at medium baselines from reactors may be used by JUNO to reveal the neutrino mass hierarchy that describes the ordering of the neutrino mass eigenstates.

Moreover, the versatility of these detectors enables them to double as observatories for low-energy neutrinos from astrophysical objects. While Borexino has by now performed an almost complete measurement of the solar neutrino spectrum, the increased target mass of JUNO will provide sensitivity to the faint flux of the Diffuse Supernova Neutrino Background and detailed understanding of the neutrino burst from a long-awaited galactic Supernova. Therefore, the investigation of low-energy neutrinos is expected to remain a rich field of research for many years to come.