

# **Neutron Skins of Nuclei: from laboratory to stars: Introductory Workshop**

**Monday, May 4, 2015 - Thursday, May 7, 2015**

**Mainz Institute for Theoretical Physics  
Johannes Gutenberg University**

## **Scientific Program**

The workshop will discuss theoretical calculations of neutron skins and experimental techniques to measure them.

Theoretical calculations include:

- 1) Chiral effective field theory and other microscopic approaches of symmetric, asymmetric nuclear, and pure neutron matter -- including properties of three neutron forces, and convergence of the chiral expansion as a function of density.
- 2) Microscopic coupled cluster and no core shell model calculations of neutron skins in light and medium mass nuclei and the role of three neutron forces.
- 3) Density functional calculations of medium and heavy nuclei including neutron-skin predictions with properly quantified error bars and their correlation to other observables, such as the location of the neutron drip line.
- 4) Calculations of crustal properties of neutron star, nuclear pasta, and possible correlations to neutron skins.

From the experimental side, the workshop will discuss and compare a variety of techniques focusing on their relative merits and on the realistic estimates of systematic errors.

Experiments include:

- 1) parity-violating electron scattering,
- 2) measurements of the electric dipole polarisability,
- 3) coherent pion photo-production,
- 4) proton nucleus elastic scattering,
- 5) study of pygmy resonance and other low lying excitations in very neutron rich nuclei, and
- 6) coherent elastic neutrino-nucleus scattering.