

Thursday, July 14, 2016

Neutron Skins of Nuclei: Executive Summary

The main goal of the two-week program on *Neutron Skins of Nuclei* was to gather all stakeholders interested in the determination of the neutron skins of nuclei, their impact on the density dependence of the symmetry energy, and ultimately on the physics of neutron-rich matter. The program attracted nearly 40 scientists — both theorists and experimentalists — working on a variety of areas connected to the main theme of the program, such as electron scattering, atomic parity violation, hadronic reactions, and gravitational wave astronomy.

The primary goal of the program was to establish quantitatively the strengths and limitations of the various experimental techniques through a detailed analysis of systematic errors. Moreover, given that in most instances theory must be used to connect the measured experimental observable to the neutron skin, it was also essential to quantify the statistical and systematic errors associated with the given theory. It was enormously gratifying to see most of the participants adhere to these guidelines and to engage in open and frank discussions on the weaknesses of their approach. As a consequence of these sincere discussions, a path forward was carved for the design of a suite of experiments that will provide meaningful constraints on the density dependence of the symmetry energy.

In an effort to discuss and compare the variety of experimental techniques, we have committed to publish a Topical Review in the Journal of Physics G. The aim of the review is to document the relative merits of each experiment and to provide a realistic estimate of systematic errors that include the connection between the measured observable and the extraction of the neutron skin, which often relies on theoretical models. Ultimately, we trust that the topical review will become a long-lasting document that will both animate and illuminate the nature of neutron rich matter.