Overview of the experimental constraints on nuclear symmetry energy

B. Tsang[1]

[1]*National Superconducting Cyclotron Laboratory and Joint Institute of Nuclear Astrophysics, Michigan State University, East Lansing MI 48824, USA*

The symmetry energy term in the nuclear equation of state affects many aspects of nuclear astrophysics, nuclear structure, and nuclear reactions. A decade ago, Brown [1] showed that realistic parameterizations of the Skyrme interactions that fit the binding energy differences between ^{100}Sn and ^{132}Sn nuclei yield very different symmetry term in the nuclear equation of state and predict a large range of the skin radii of ^{208}Pb. Substantial progress has been achieved in recent years in constraining the density dependence of nuclear symmetry energy at and around the saturation density with a wide range of experiments. In the talk, I will review current experimental constraints on the symmetry energy from different experiments. I will also examine recent skin thicknesses measurements of ^{208}Pb and compare their findings with the constraints obtained from symmetry energy. The results are compared to modern day calculations on the neutron matter equation of state including 3-body neutron force. The talk will also discuss the implications of the constraints to nuclear structure and astrophysics and give an up-to-date assessment in the ongoing quest to determine the symmetry energy dependence in regions above the nuclear matter density.