

# The symmetry energy and instabilities in a neutron star matter.

Sebastian Kubis<sup>1</sup>

<sup>1</sup>The Henryk Niewodniczański Institute of Nuclear Physics, Polish Academy of Sciences ,  
Kraków

**ABSTRACT:** The commonly accepted thermodynamical state of matter in a neutron star is based on beta equilibrium and positive compressibility of matter. The matter compressibility is connected to the baryon number fluctuations. However, the full stability is actually achieved when charge fluctuations are also stable. In this talk the extended stability conditions will be formulated and their connections to the nuclear symmetry energy are to be discussed. Because the density dependence of the symmetry energy is not exactly known, its different behaviors would lead to different types of matter in neutron star core.