Baryons and antibaryons in compressed nuclear matter *

Theodoros Gaitanos and Arsenia Chorozidou
Dept. of Physics, Aristotle University of Thessaloniki, Greece

The in-medium properties of baryons without and with strangeness degrees of freedom are investigated in nuclear matter at various densities and, in particular, at high densities relevant for astrophysical purposes, e.g., neutron stars. That is, the density and momentum dependent potentials of protons, neutrons and especially of hyperons are discussed in the spirit of a relativistic mean-field theoretical model. We give attention to the high-density sector of the hadronic Equation of State (EoS) and to the high-density part of the Schroedinger-equivalent optical potential.
Furthermore, we focus on the in-medium behaviors of antibaryons. That is, the potentials of antinucleons and of antihyperons at various densities and single-particle momenta. We five again attention to the extreme cases of high densities and momenta, which can be relevant for nuclear-astrophysical purposes.
We compare our theoretical predictions with existing empirical information and with microscopic models showing that the relativistic mean-field model with momentum-dependent regulators is a reliable approach for a broad description of various nuclear systems.