

The ASY-EOS experiment at GSI: investigating symmetry energy at supra-saturation densities

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The elliptic-flow ratio of neutrons with respect to protons or light complex particles in reactions of heavy-ions at pre-relativistic energies is proposed as an observable sensitive to the strength of the symmetry term in the nuclear equation of state at supra-saturation densities. The results obtained from the existing FOPI/LAND data for $^{197}\text{Au} + ^{197}\text{Au}$ collisions at 400 MeV/nucleon in comparison with the UrQMD model favour a moderately soft symmetry term but suffer from a considerable statistical uncertainty [1]. These results have been confirmed by an independent analysis based on Tübingen QMD [2]. In order to obtain an improved data set for Au+Au collisions and to extend the study to other systems, a new experiment was carried out at the GSI laboratory by the ASY-EOS collaboration in May 2011 [3]. The flows of neutrons, protons and light complex particles were measured for $^{197}\text{Au} + ^{197}\text{Au}$, $^{96}\text{Ru} + ^{96}\text{Ru}$, and $^{96}\text{Zr} + ^{96}\text{Zr}$ collisions at 400 MeV/nucleon using the Large Area Neutron detector LAND, four double-rings of the forward part of the CHIMERA multi-detector, the ALADIN ToF-Wall, the KRATTA Si-CsI triple-telescope array and the Microball detectors. First results, including elliptic flow ratios for Au+Au, will be reported.

[1] P. Russotto et al., Phys. Lett. B 697 (2011) 471.

[2] M.D. Cozma, Phys. Lett. B 700, 139 (2011).

[3] P. Russotto et al., arXiv:1209.5961 [nucl-ex].