Contribution ID: **128** Type: **Invited Talk - Parallel Session**

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

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% write your abstract here
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 $^{197}Au + ^{197}Au$ 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 T\"{u}bingen 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 [3]. The flows of neutrons and light charged particles were measured for $^{197}Au + ^{197}Au$, $^{96}Ru + ^{96}Ru$, and $^{96}Zr + ^{96}Zr$ 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 comparison of elliptic flow ratios with UrQMD calculations for Au+Au system, will be reported.

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%[1] A. AAAA \emph{et al.}, Phys. Rev. Lett. {\bf 1}, 1 (2015)
[1] P. Russotto \emph{et al.}, Phys. Lett. {\bf B 697} (2011) 471.

[2] M.D. Cozma, Phys. Lett. {\bf B 700}, 139 (2011); M.D. Cozma \emph{et al.}, Phys. Rev. {\bf C} 88, 044912 (2013).

[3] P. Russotto \emph{et al.}, Eur. Phy. J {\bf A 50}, 38 (2014).

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