

Abstract Submitted
for the TSF11 Meeting of
The American Physical Society

Magnetic effects in heavy-ion collisions at intermediate energies¹

LI OU, BAO-AN LI, Department of Physics and Astronomy, Texas A&M University-Commerce — The time-evolution and space-distribution of internal electromagnetic fields in heavy-ion reactions at beam energies between 0.2 to 2 AGeV are studied within IBUU11 model. While the magnetic field can be significantly higher than the estimated surface magnetic field of magnetars, it has almost no effect on nucleon observables as the Lorentz force is normally much weaker than the nuclear force. Very interestingly, however, the magnetic field generated by the projectile-like (target-like) spectator has a strong focusing/diverging effect on π^+/π^- at forward (backward) rapidities. Consequently, the differential π^-/π^+ ratio as a function of rapidity is significantly altered by the magnetic field while the total multiplicities of both positive and negative pions remain about the same. At beam energies above about 1 AGeV, the differential π^-/π^+ ratio is sensitive to the density dependence of nuclear symmetry energy $E_{\text{sym}}(\rho)$. So magnetic effects should be carefully considered in future studies of using the differential π^-/π^+ ratio as a probe of the $E_{\text{sym}}(\rho)$ at supra-saturation densities.

¹This work is supported by the US National Science Foundation grant PHY-0757839, PHY-1068022 and the US National Aeronautics and Space Administration under grant NNX11AC41G issued through the Science Mission Directorate.

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Date submitted: 03 Sep 2011

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