

# Measurements on Proton and Light Nuclei Production in Au+Au Collisions by RHIC-STAR in the High Baryon Density Region

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1      Light nuclei, such as deuteron and triton, are loosely bound object and their yields are  
2      expected to be sensitive to the baryon density fluctuations and may be used to probe the  
3      signature of 1st order phase transition and/or critical point in heavy-ion collisions. In the  
4      beam energy scan program at RHIC, the STAR experiment has taken the data of Au+Au  
5      collision at center of mass energy ( $\sqrt{s_{NN}}$ ) down to 3.0 GeV in fixed-target mode, extending  
6      the  $\mu_B$  coverage up to 720 MeV. The measurements of light nuclei production at these fixed-  
7      target energies can provide essential insights into production mechanism of light nuclei and  
8      nuclear matter equation of state at high baryon density, where the production of light nuclei  
9      is significantly enhanced.

10      In this poster, we will present collision centrality and rapidity dependence of the proton and  
11      light nuclei production in Au+Au collisions at  $\sqrt{s_{NN}} = 3.0 - 4.5$  GeV recorded by the STAR  
12      experiment in the fixed-target mode. The transverse momentum ( $p_T$ ) spectra, coalescence  
13      parameters ( $B_A$ ), particle ratios, kinetic freeze-out temperature  $T_{kin}$  and collective velocity  $\beta_T$   
14      will be shown and compared with the results from collider energies  $\sqrt{s_{NN}} = 7.7 - 27$  GeV.