

Production of Light Nuclei in Heavy-ion Collisions Measured by RHIC-STAR

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1 Light nuclei production is predicted to be sensitive to local baryon den-
2 sity fluctuations and can be used to probe the QCD phase structure. Since
3 2018, the STAR experiment has collected high statistics data in Au+Au col-
4 lisions at $\sqrt{s_{\text{NN}}} = 3$ GeV (BES-II fixed-target mode), 14.6, 19.6 GeV (BES-II
5 collider mode) and isobaric collisions (Ru+Ru and Zr+Zr) at $\sqrt{s_{\text{NN}}} = 200$
6 GeV. Those datasets allow us to access the QCD phase structure over a
7 broad range of baryon density ($\mu_B : 20 \sim 750$ MeV).

8 In this talk, we will present the first measurement of centrality, trans-
9 verse momentum, and rapidity dependences of proton (p), deuteron (d),
10 triton (t), ^3He , and ^4He production in Au+Au collisions at $\sqrt{s_{\text{NN}}} = 3$ GeV,
11 p , d , ^3He at $\sqrt{s_{\text{NN}}} = 14.6, 19.6$ GeV, and p , d , t , ^3He in Ru+Ru and Zr+Zr
12 collisions at $\sqrt{s_{\text{NN}}} = 200$ GeV. The kinetic freeze-out parameters (T_{kin} and
13 $\langle\beta_T\rangle$) versus collision centrality and particle rapidity will be presented and
14 compared with those of light hadrons (π , K , p).