

The spatial sub-separation of strangeness from antistrangeness in heavy-ion collisions at energies of FAIR and NICA

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Problem statement

- To do the analysis of the spacio-temporal evolution of all particles in all cells, in the $T - \mu_B, T - \mu_S$ plane, and the analysis of the finally emitted particles in $x - t$ plane.
- See the spacial separation of strange particles from non strange (and of mesons from baryons).
- Find T, μ_B, μ_S of different particles at freeze-out time.

$$n_i = \frac{g_i}{(2\pi)^3} \int f(p, m_i) d^3 p, \quad (1)$$

$$\epsilon_i = \frac{g_i}{(2\pi)^3} \int \sqrt{p_i^2 + m_i^2} f(p, m_i) d^3 p, \quad (2)$$

$$f(p, m_i) = \exp\left(-\frac{\epsilon_i - \mu_i}{T}\right), \quad (3)$$

$$\mu_i = B_i \mu_B + S_i \mu_S. \quad (4)$$

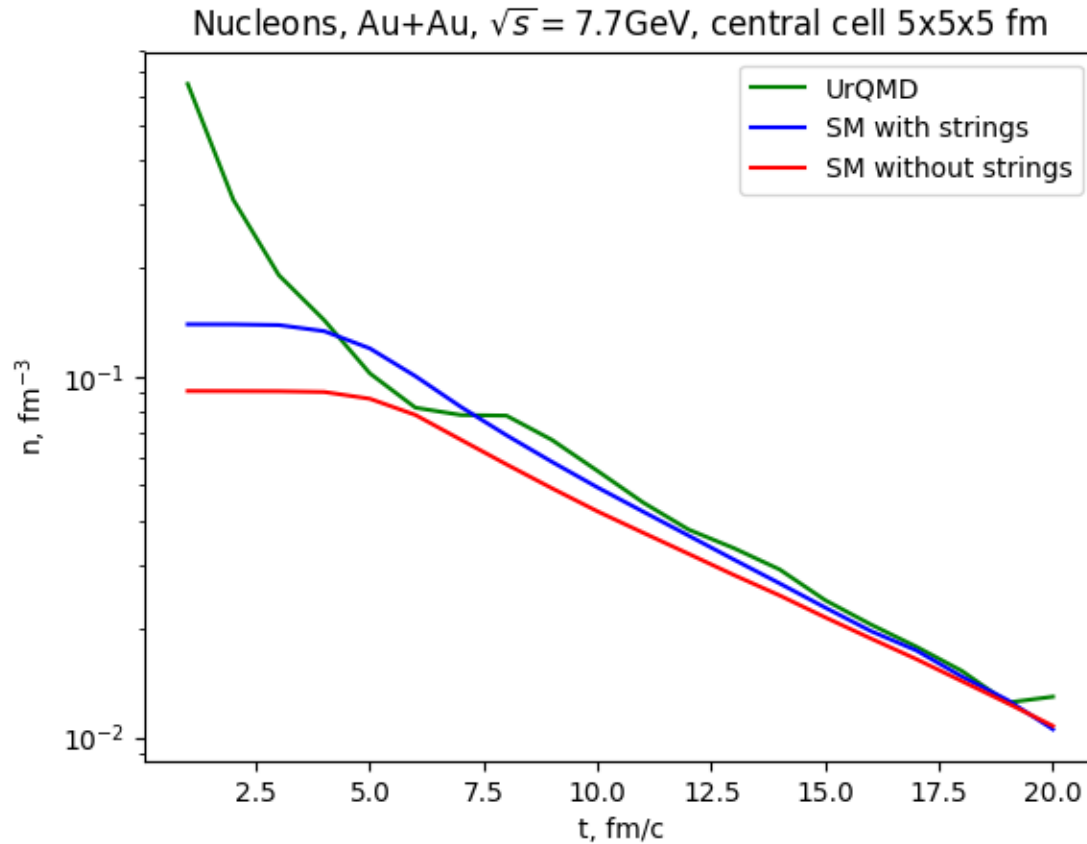


Figure 1: Nucleon density in the central cell at times 1 – 20 fm/c.

Lambdas+Sigmas, Au+Au, $\sqrt{s} = 7.7\text{GeV}$, central cell $5\times 5\times 5\text{ fm}$

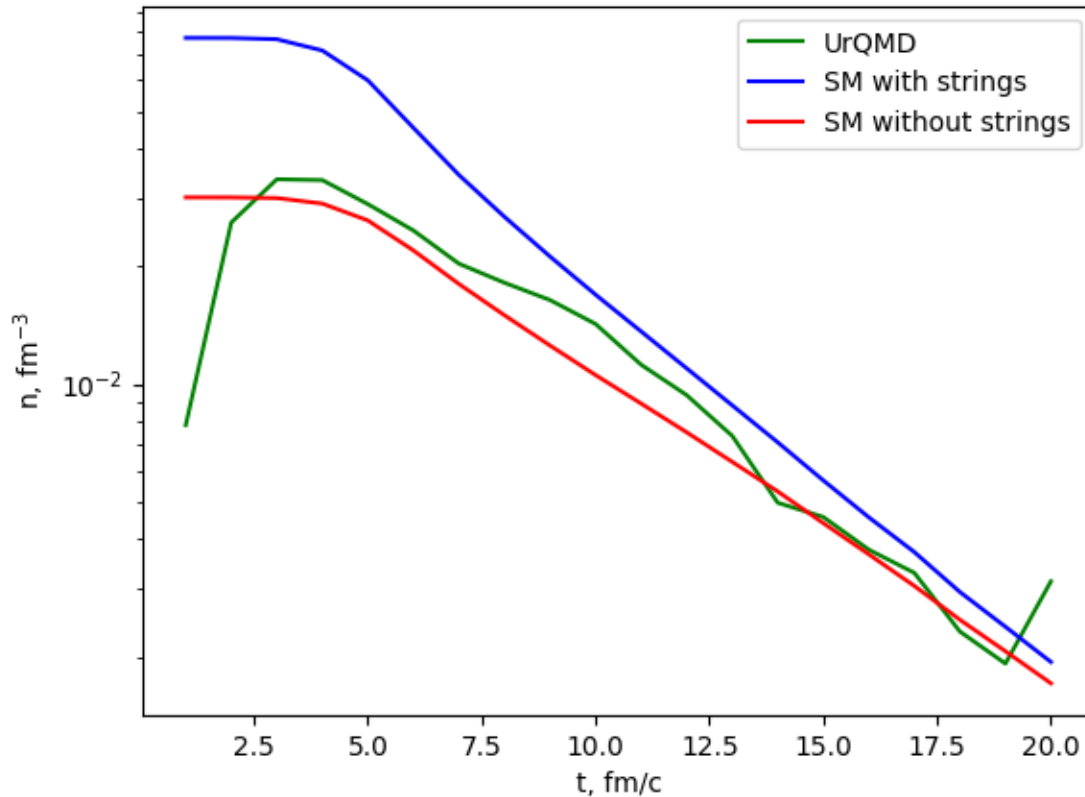


Figure 2: Lambda+Sigma density in the central cell at times 1 – 20 fm/c.

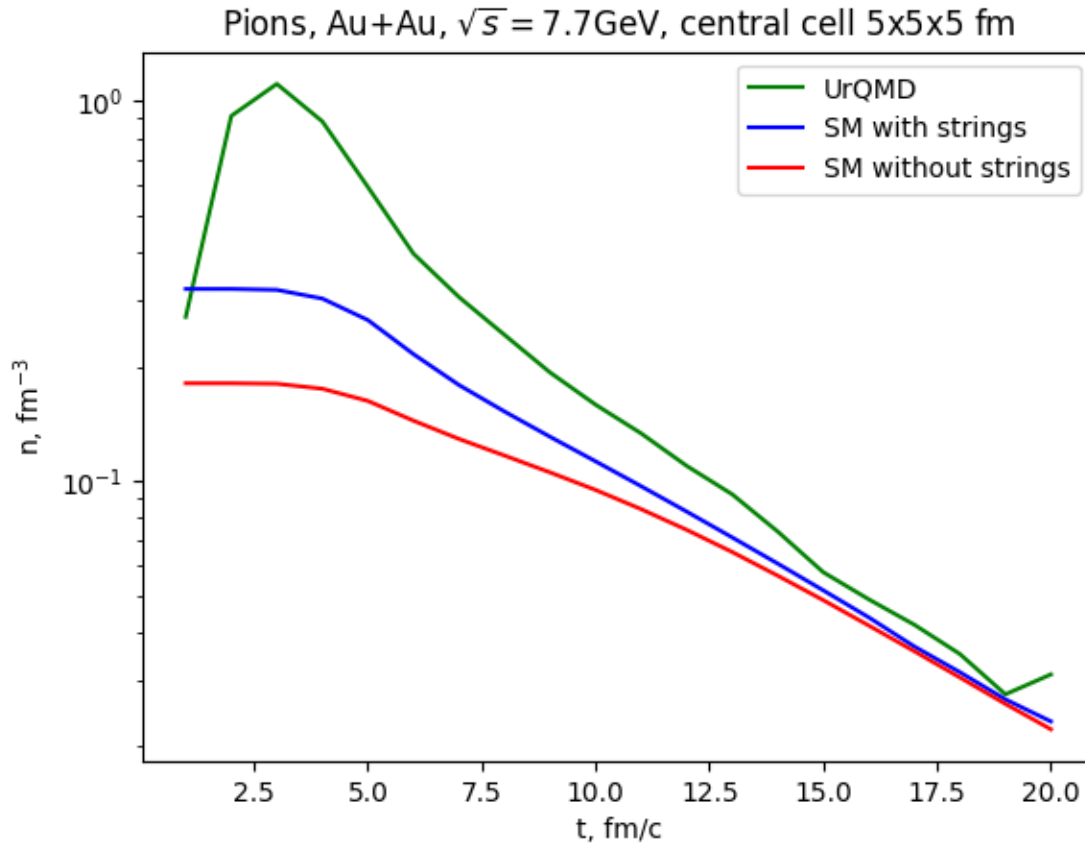


Figure 3: Pion density in the central cell at times 1 – 20 fm/c.

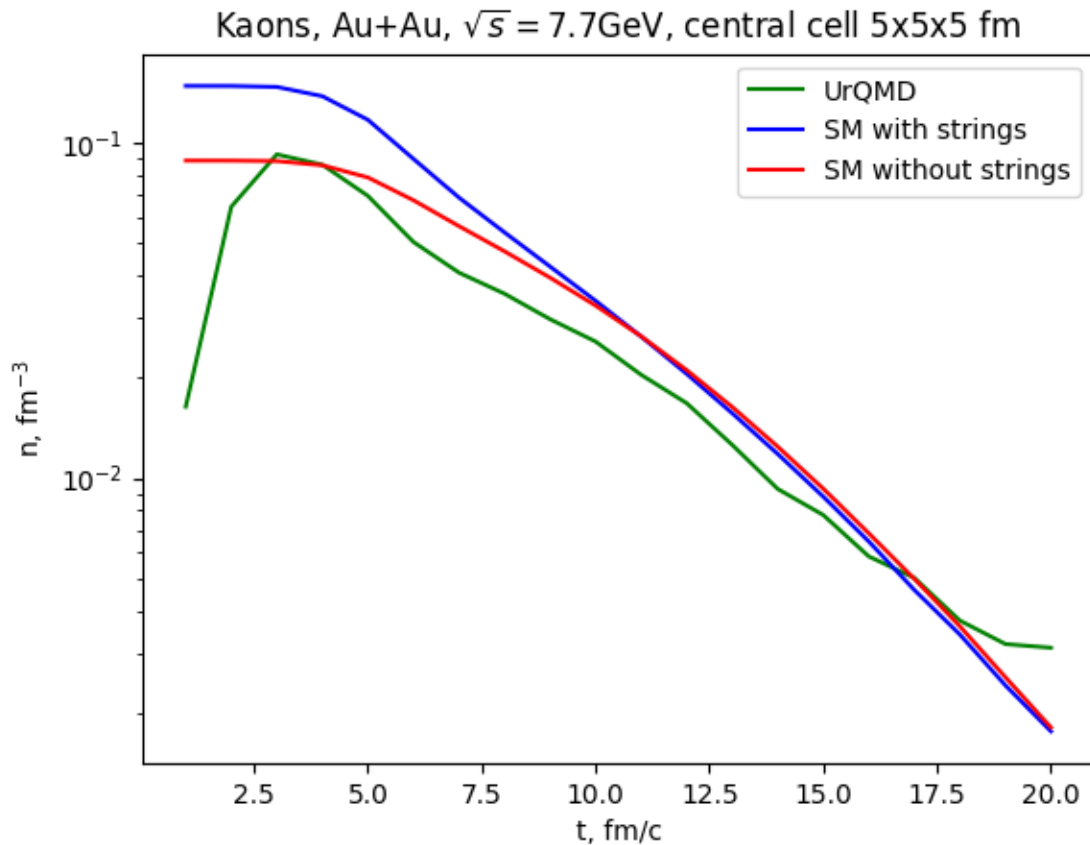


Figure 4: Kaon density in the central cell at times 1 – 20 fm/c.

Freeze-out spectra

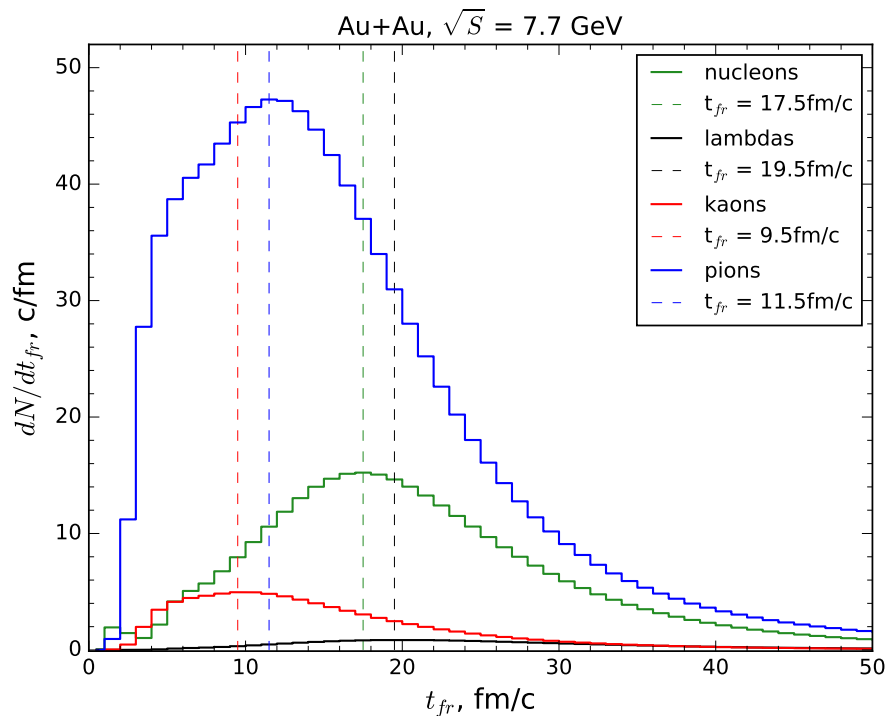


Figure 5: dN/dt_{fr} spectra.

$T(\mu_B)$ in the central cell

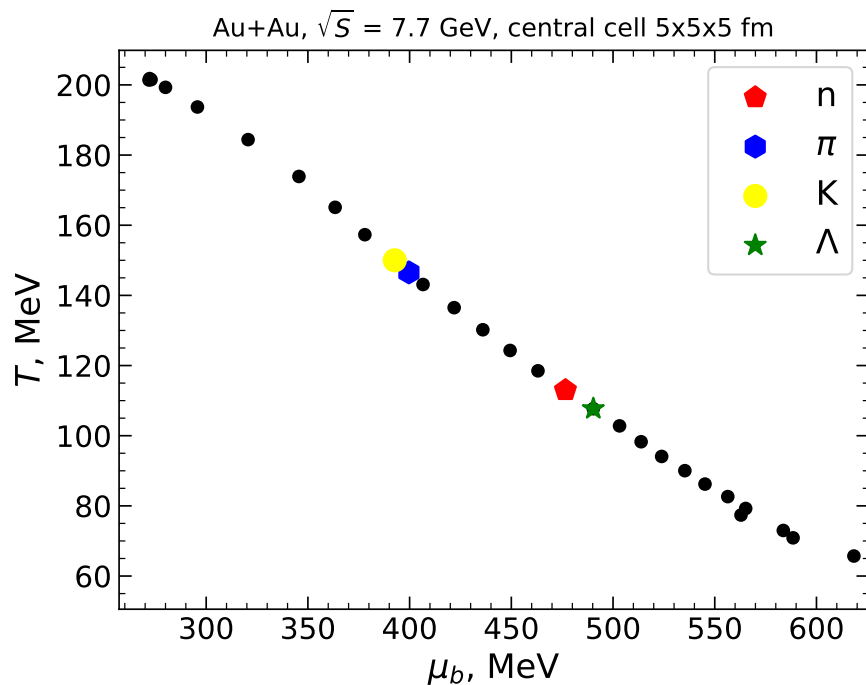


Figure 6: $T(\mu_B)$ in the central (5x5x5 fm) cell. Average freezeout time in central cell: nucleons — 15.9 fm/c, pions — 10.4 fm/c, lambdas — 17.2 fm/c, kaons — 9.8 fm/c.

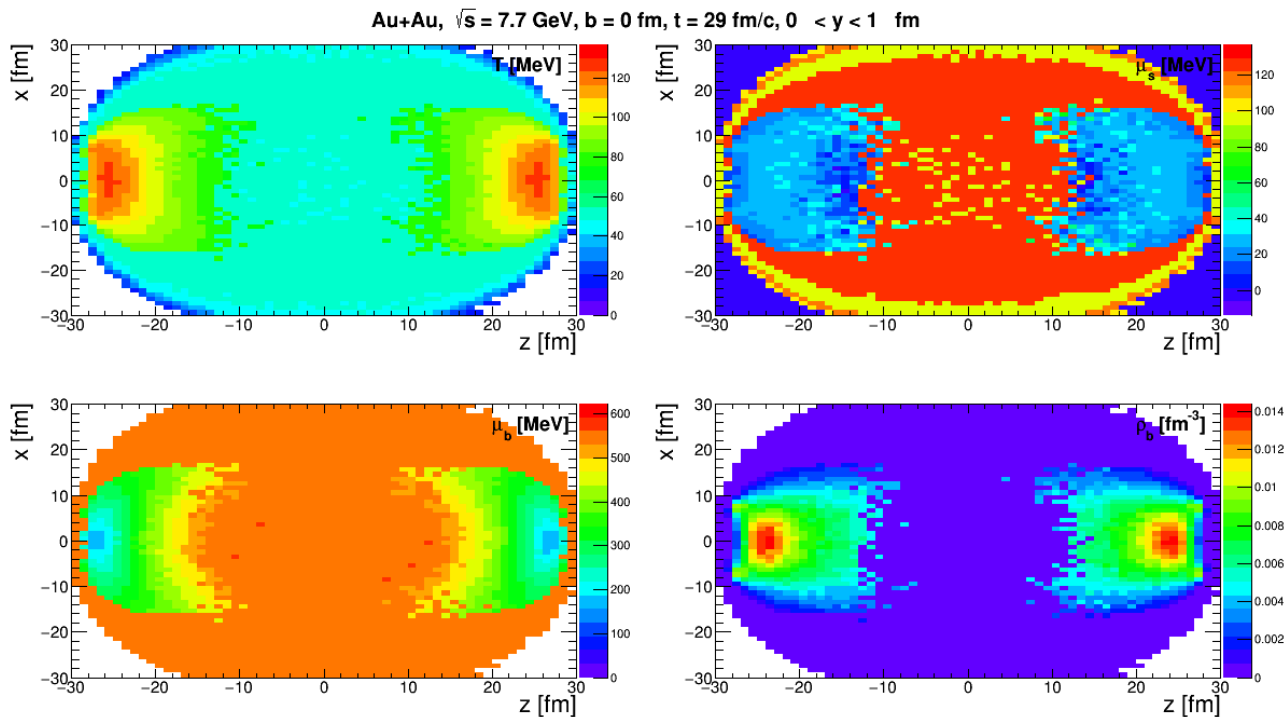


Figure 7: Spatial distribution of T , μ_B , μ_S , ρ_B at time 29 fm/c.