Is there one thermal source or many in Au-Au Collisions?

Michael Murray for the BRAHMS Collaboration

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Particle abundances from heavy ion collisions are commonly described in terms of thermal fits [1, 2]. This is normally done using 4π yields but recently, thermal models have been applied to data from narrow regions around y=0. The use of such narrow rapidity regions has been justified by invoking "boost invariance" and assuming that the central rapidity region has zero net strangeness. The success of this approach raises the question of whether strangeness is locally conserved or perhaps "distilled" into regions of high baryon density. The wide rapidity dependence of BRAHMS' data allows us to test if Au-Au collisions are in global thermal equilibrium or if there are several sources at different rapidities, each of which is in local thermal equilibrium. We searched a large set of model calculations on a two dimensional grid of temperature and baryo-chemical potential to find the best fit to five independent particle ratios at a given rapidity [3]. For all rapidities the fit converges, suggesting that strangeness may be a locally conserved quantity. We will also contrast these results to lower energy work and results from lighter systems.

References

[1] P. Braun-Munzinger, J. Stachel, J. P. Wessels and N. Xu, Phys. Lett. B **365**, 1 (1996) and Phys. Lett. B **344**, 43 (1995)

[2] F. Becattini and U. W. Heinz, Z. Phys. C **76**, 269 (1997) and F. Becattini and G. Pettini, Phys. Rev. C **67**, 015205 (2003)

[3] Grids of themal model predictions have been supplied by F. Beccatini and P. Braun-Munzinger.