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Search for QCD Hawking Radiation in Heavy Ion Collisions
LAURA STILES, MICHAEL MURRAY, University of Kansas — A wide variety of measurements at RHIC, for example v_2 and energy loss, suggest that the partonic matter created in heavy collisions thermalizes early. One possible mechanism for this is the creation of the QCD analogue to gravitational black holes [1]. Such objects have no memory of their creation and radiate with a characteristic temperature, T, that can depend only on their energy, charge, and angular momentum. This hypothesis is consistent with the growth of multiplicity with $\sqrt{s}$ in e+e- collisions and thermal temperature observed at LEP. For central heavy ion collisions the angular momentum of the system is approximately zero and the model predicts a universal dependence of the chemical freezeout temperature on the ratios of charge to transverse energy. To test this prediction against BRAHMS data, We have fitted data on π, K, p and $\bar{p}$ from central Au + Au collisions at several rapidities and energies, using the THERMUS code. The experimental dependence of the temperature on the ratio of charge to transverse energy will be compared to the Hawking radiation predictions. By comparing data sets at different energy, centrality and rapidity we can select systems with the same ratio of baryon number to energy but different rapidities. This may allow us to test for any effect of angular momentum on temperature. [1] P. Castorina, D. Kharzeev and H. Satz, Eur. Phys. J. C 52, 187 (2007)

Laura Stiles
University of Kansas

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