Description of charged particle pseudorapidity distributions in Pb+Pb collisions with Tsallis thermodynamics

G. Yuan,[1] H. Zheng,[2] L.L. Zhu,[3] and A. Bonasera[2, 4]

[1]*School of Information Engineering, Hangzhou Dianzi University, Hangzhou, China*;

[2]*Laboratori Nazionali del Sud, INFN, I-95123 Catania, Italy*;

[3]*College of Physical Science and Technology, Sichuan University, Chengdu, China*;

[4]*Cyclotron Institute, Texas A&M University, College Station, Texas*

The centrality dependence of pseudorapidity distributions for charged particles produced in Au+Au collisions at sqrt(s)$_{NN}$ = 130 GeV and 200 GeV at RHIC, and in Pb+Pb collisions at sqrt(s)$_{NN}$ = 2.76 TeV at LHC are investigated in the fireball model, assuming that the rapidity axis is populated with fireballs following one distribution function. We assume that the particles in the fireball fulfill the Tsallis distribution. The theoretical results are compared with the experimental measurements and a good agreement is found as shown in Fig. 1. Using these results, the pseudorapidity distributions of charged particles produced in Pb+Pb central collisions at sqrt(s)$_{NN}$ = 5.02 TeV and 10 TeV are predicted.

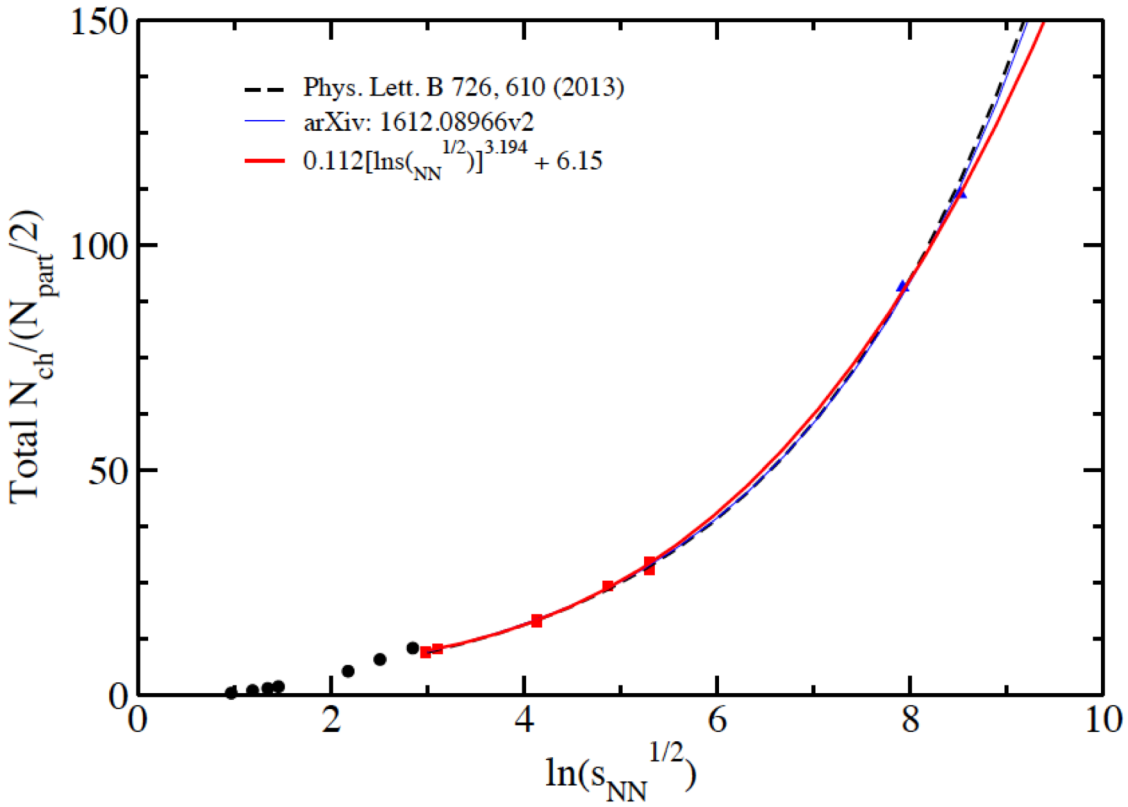

FIG. 1. The total number of charged particles per participant pair produced in the most central collisions versus ln(sqrt(s)$_{NN}$). The experimental data at AGS (0-5% Au+Au), SPS (0-5% Pb+Pb), RHIC (0-6% Au+Au and 0-6% Cu+Cu) and LHC (Pb+Pb 0-5%) are taken from Refs. In the inset. The curves are our fitting results and the ones from Refs. In the inset.