Statistical HAdronization with REsonances (SHARE)
-- allowing for chemical non-equilibrium --
describes all soft hadron yields from ALICE Pb-Pb at 2.76 TeV

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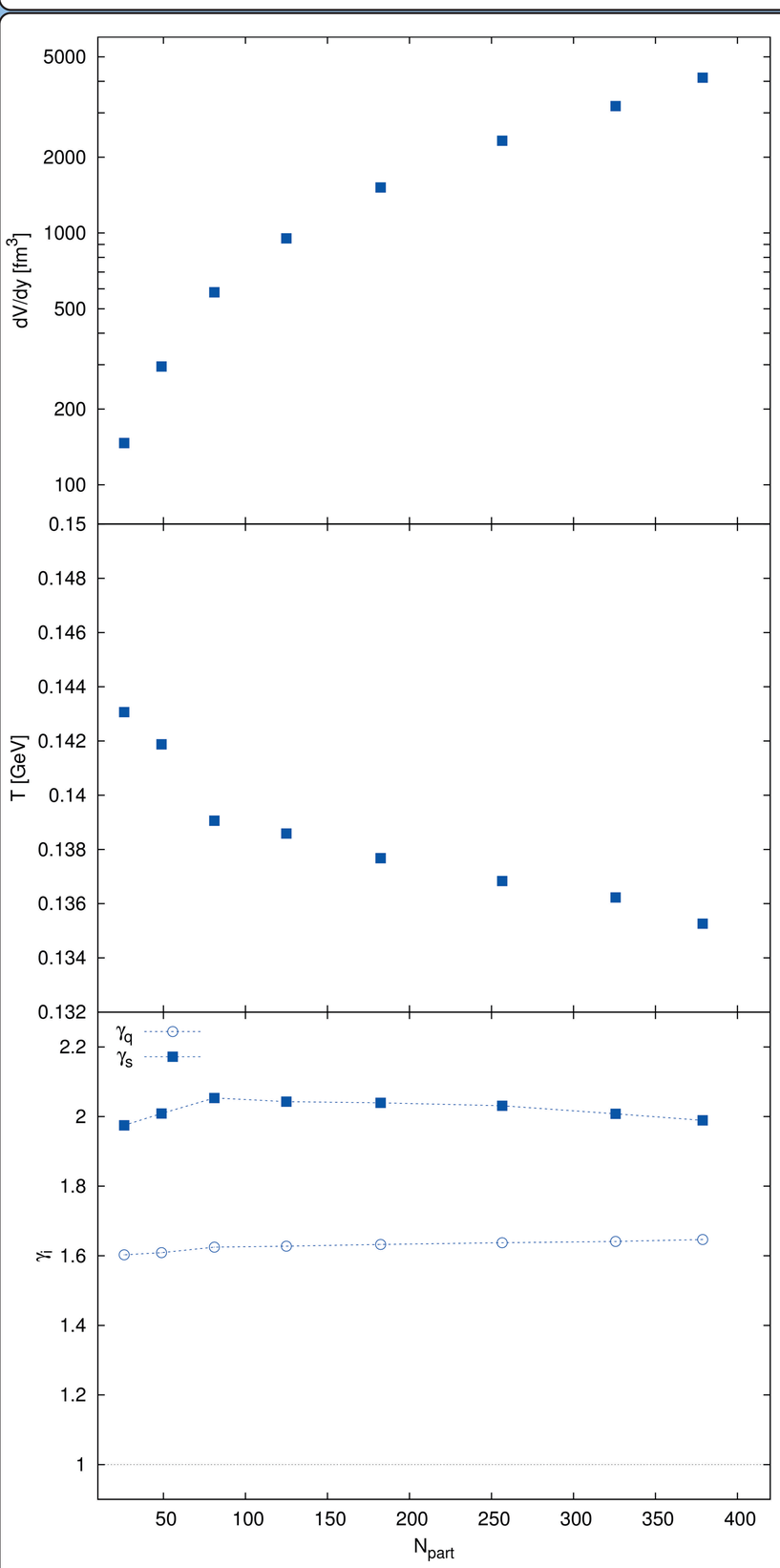
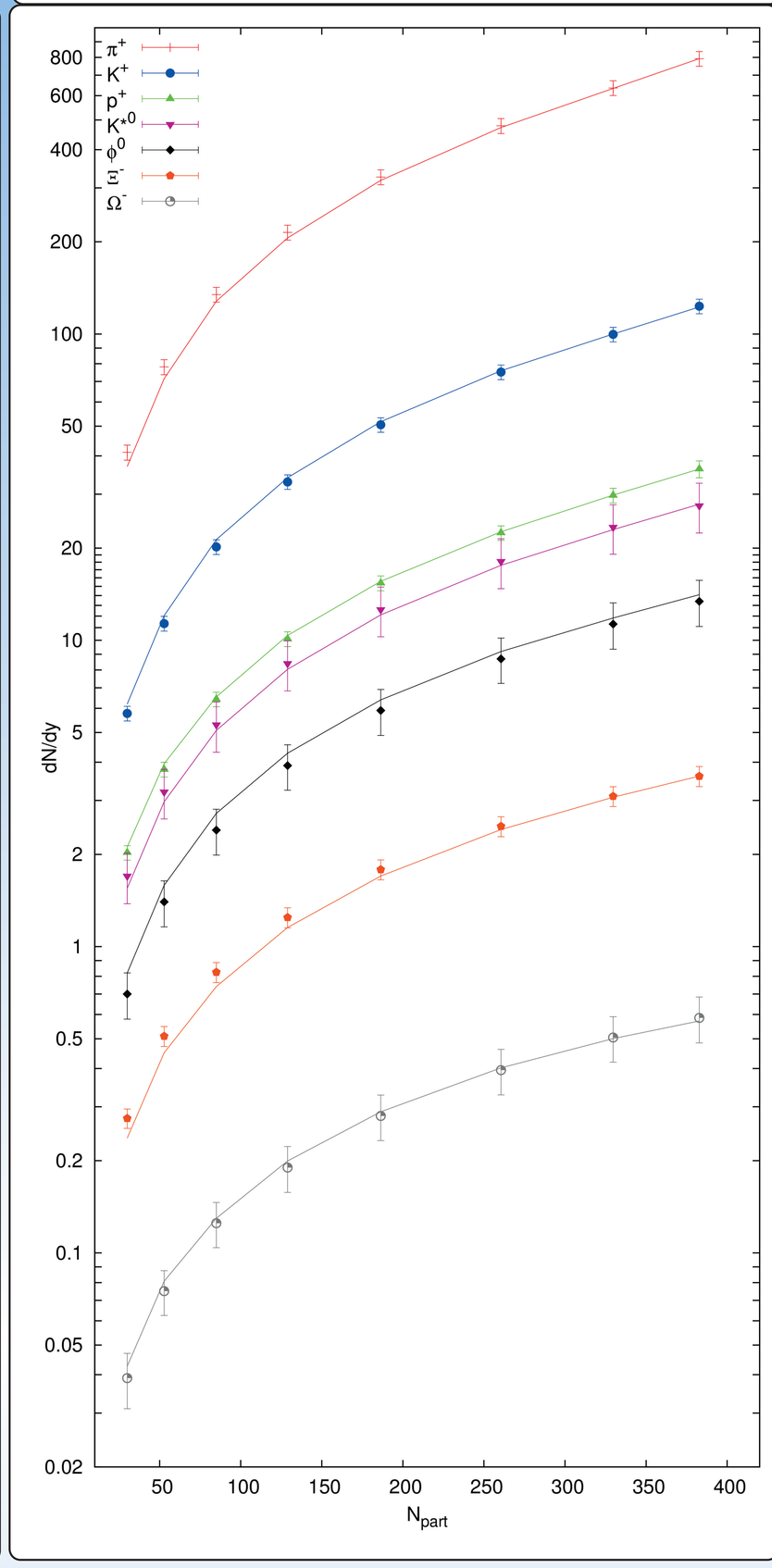
Soft hadron production at LHC energies presented a new challenge for the statistical hadronization model (SHM). We show that the SHARE chemical non-equilibrium model describes well the available hadron yield data. We obtain a remarkably accurate description of hadron yields at energy $\sqrt{s_{NN}}$ =2.76 TeV for several high multiplicity centrality bins. We show that non-equilibrium fit employing SHARE, is fully consistent with our understanding of AuAu data at 62.4 and 200 GeV. This demonstrates the overall superiority of the chemical non-equilibrium SHM model in predicting hadron production in relativistic heavy ion collisions.
Poster can be downloaded from: http://www.physics.arizona.edu/~petran/files/QM2012-posters/poster2.pdf

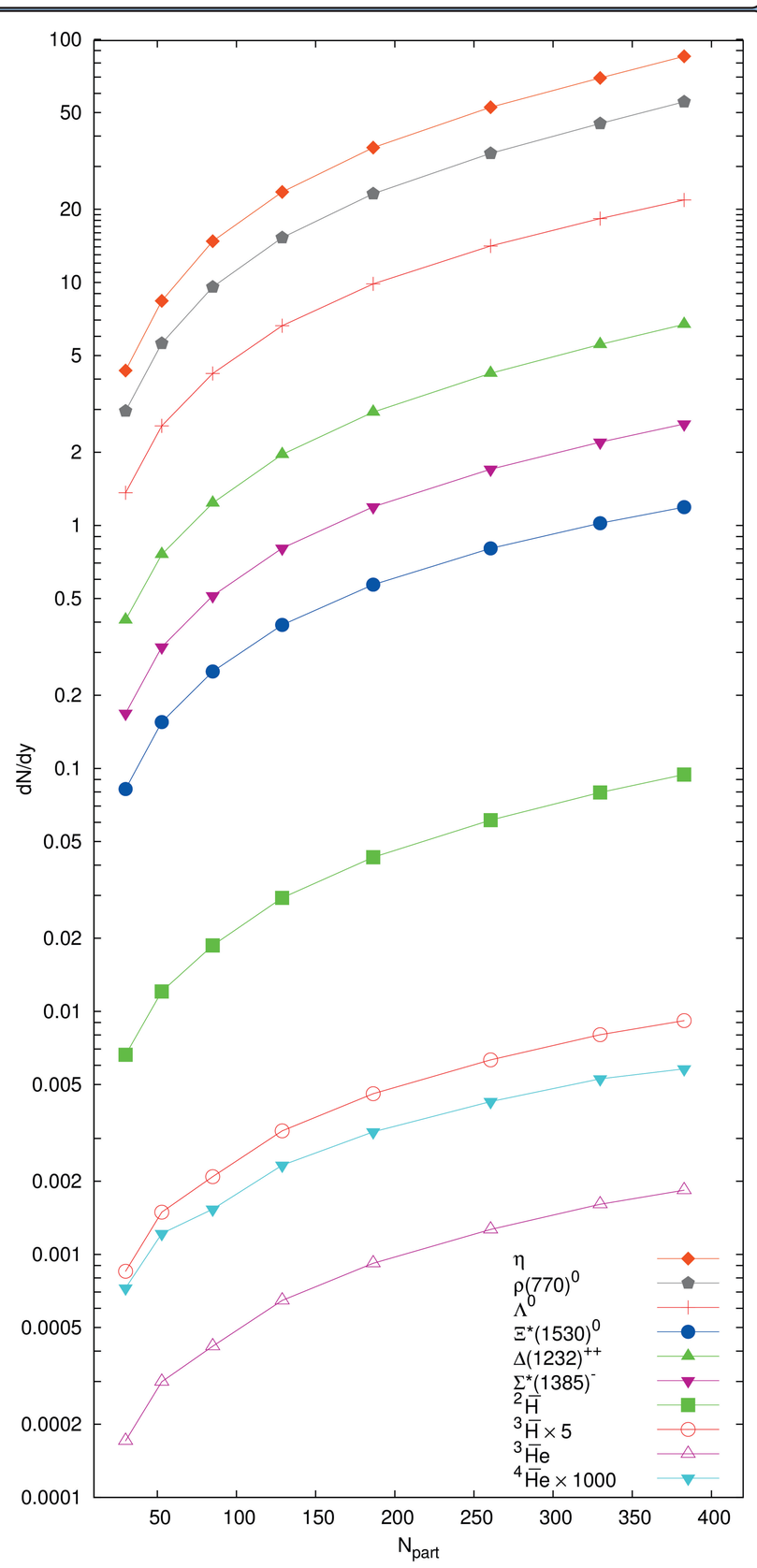
Model parameters



Fitted particles



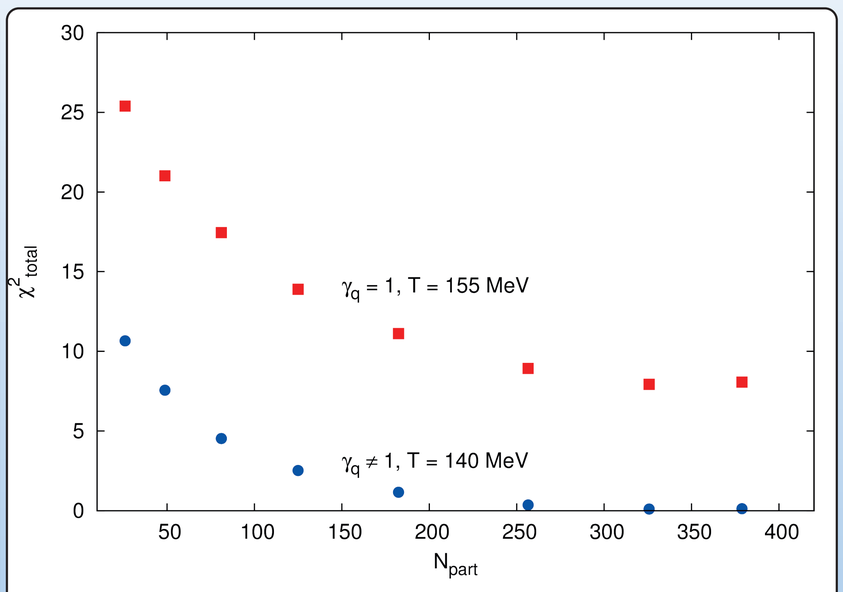
Predicted particles



To allow for chemical non-equilibrium we introduce light quark phase space occupancy $\gamma_q \neq 1$. The salient feature of this parameter is that

$$\text{baryons} \propto \gamma_q^3 \qquad \text{mesons} \propto \gamma_q^2$$

For this reason when $\gamma_q > 1$, p/π can be enhanced as observed at RHIC-62 and 200 GeV and now even more strongly at LHC-ALICE at 2.76 TeV. The SHARE program [1] was conceived to allow for chemical non-equilibrium $\gamma_q \neq 1$, for early review see [2]. **All particle yields are very well fitted as a function of N_{part}. This allows to predict unmeasured yields also tesing if bound antimatter is made in break up of QGP.**



Since we see that χ^2 is up to 10 times larger for equilibrium compared to non-equilibrium model, and the equilibrium χ^2 values are very large, the equilibrium model is ruled out in agreeement to reports of Alice collaboration. This means that earlier claims of chemical equilibrium are proven to be wrong.
To reduce χ^2 for the peripheral collisions we developed SHARE with CHARM program where we include in the fit the multiplicity of soft hadrons originating in the decay of charmed mesons, see poster 319, stand 300.

References:
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[3] ALICE presentations from SQM 2011 and QM 2012.
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[5] J.Rafelski, J.Letessier and G.Torrieri, Phys. Rev. C 72, 024905 (2005)

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