



## Mass hierarchy and energy scaling of the Tsallis–Pareto parameters in hadron productions at RHIC and LHC energies

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The identified hadron spectra measured in high energy particle collisions are one of the most fundamental observable quantities. They accumulate information about all the processes during the collisions. They may carry information about all the microscopical and collective processes which occur during high-energy collisions, therefore it is essential to measure and analyze them as precise as possible in a wide energy range. We need to analyze not just the experimental data but also the result of theoretical and Monte Carlo event generators, that contain all of the latest physical phenomena and effects. This can give us feedback for future models of the hadron formation.

Using the latest, high-accuracy experimental data we could investigate the energy dependence of the Tsallis–Pareto fit parameters, indeed observing mass and c.m. energy scaling of the hadron production in proton–proton collisions [1,2].

Using the q-entropy formula, we may interpret the microscopic physics in terms of the Tsallis  $q$  and  $T$  parameters. This gives us another excellent opportunity to compare the parameters of baryons with those of mesons or even strange particles with the non-strange ones.

In this presentation we extend our above study and investigate the mass hierarchy and the energy effect of the strange and heavy hadronic states and also compare our result to the results of the HIJING++, our soon-to-be published Heavy Ion Jet Interaction Generator [3].

[1] Bíró, G.; Barnaföldi, G.G.; Bíró, T.S.; Ürmösy, K.; Takács, Á. Systematic Analysis of the Non-extensive Statistical Approach in High Energy Particle Collisions –Experiment vs. Theory. *Entropy* **2017**, 19(3), 88.

[2] Bíró, G.; Barnaföldi, G.G.; Bíró, T.S.; Ürmösy, K. Application of the Non-extensive Statistical Approach to High Energy Particle Collisions. **2016**, arXiv:1608.01643

[3] Barnaföldi, G.G.; Bíró, G.; Gyulassy, M.; Haranóz, Sz.M.; Lévai, P.; Ma G.; Papp, G.; Wang, X-N.; Zhang, B-W. First Results with HIJING++ in High-Energy Heavy-Ion Collisions. **2017**, arXiv:1701.08496

### List of tracks

Freeze-out, hadronisation and statistical models

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