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Near and Far from Equilibrium Power-Law Statistics

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A review of simple statistical concepts leading to power-law tailed hadron energy distributions is given, distinguishing mechanisms near to and far from thermo-dynamical equilibrium. In the former case special attention is given to connections with non-Gaussian fluctuations and modern entropy formulas, while in the second the analogy with growing network statistics is most expedient.
The power-law tailed energy distribution and the negative binomial multiplicity distribution are intimately related, both having the textbook thermodynamical limit as the exponential and the Poisson distribution. On the other hand a dynamical power-law emerges from the linear preference rate in an unbalanced growth process. These scenarios i) interpret the leading parameters of these distributions, T and q, related to physical properties of the system under study, ii) establish a connection between multiplicity and p_T distributions, and iii) possibly reveal differences between small system effects and dynamical unbalance effects in the way how T and q are correlated.
Experimental data on pp, pA and AA systems fitted by Tsallis distributions seem to behave differently in the T – q plane.

On behalf of collaboration:

None

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