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## Entropy and Multifractality in Hadron-Hadron Collisions at SPS and LHC Energies

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Multiplicity data on pp/pp collisions at {\footnotesize SPS} and {\footnotesize LHC} energies (0.2-7 TeV) are used to study the entropy production, dimensions and other multifractal characteristics of multiplicity distributions of relativistic charged particles produced. It is observed that the entropy produced in smaller and(or) larger phase space bins, when normalized to maximum rapidity, exhibits a kind of scaling which is nicely supported by Monte Carlo model, {\footnotesize PYTHIA-8} with color-reconnection({\footnotesize CR}) switched 'on'. Using the Renyi's order- $q$  information entropy, multifractal characteristics of multiplicity distributions are studied in terms of generalized dimensions,  $D_q$ . Nearly the same value of multifractal specific heat, 'c'  $\sim 0.1$ , are observed which agrees fairly well with those reported earlier for hadron-hadron (hh) collisions at lower energies. These findings, therefore, suggest that the parameter 'c' may be taken as the universal characteristic of multiparticle production in hh collisions. {\footnotesize PYTHIA} model, however, predicts somewhat lower values of 'c' as compared to those obtained with the data. The analysis is further extended to examine the spectrum of scaling indices, which might lead to make some useful conclusions on the energy dependence of degree of multifractality and smoothness of the rapidity distributions.

### Category

Experiment

### Collaboration (if applicable)

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