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Hadroproduction in high energy collisions

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The transverse momentum spectra, $d^2\sigma/(d\eta dp_T^2)$, of charged hadrons produced in various high energy interactions (pp, γp, $\gamma\gamma$, heavy-ion collisions) and measured in different experiments from ISR to LHC are considered simultaneously within several phenomenological models. As a result, the recently introduced "two component model" is shown to provide a much better description of the available experimental data than other widely used parameterizations (eg. Tsallis or Hagedorn). Moreover, the relative contributions of the two components of this model to the spectra: the exponential ("thermal") and the power-law ("hard") - are found to vary with the type and the energy of the collisions, the type of the produced hadron, the charged multiplicity and the measured pseudorapididty region. The possible mechanism of this effect is discussed: while the thermal component is produced in the fragmentation of the color string due to the effective event horizon introduced by confinement, the power-law term resembles the Regge theory with the perturbative QCD pomeron.
The observed dependences are used to make predictions on the mean transverse momenta $< p_T >$, pseudorapidity distributions $d\sigma/d\eta$ and double-differential cross-sections $d^2\sigma/d\eta dp_T^2$ at LHC-energies, which are tested on the latest experimental data and predictions for future measurements are presented.

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