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Multiplicity Dependence of Non-extensive Parameters for Strange and Multi-Strange Particles in Proton-Proton Collisions at $\sqrt{s}$ = 7 TeV at the LHC

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High-energy heavy-ion collisions at RHIC and LHC provide a unique opportunity to study nuclear matter under extreme conditions i.e. at high temperature and/or
energy density. Due to the high multiplicities produced in $p + p$ collisions, one can use the the statistical models to describe the particle production mechanism. As thermodynamically consistent Tsallis statistics has been successful in describing the transverse momentum (p_T) spectra of identified particles, we use this distribution to fit the entire p_T spectra and study the Tsallis parameters as a function of multiplicity as well as mass for the strange ($K^0_S,\ \Lambda + \bar{\Lambda}$) and multi-strange particles ($\Xi^- + \bar{\Xi}^+,\ \Omega^- + \bar{\Omega}^+$) in $p + p$ collisions at $\sqrt{s}$ = 7 TeV. The extracted non-extensive parameter decreases towards 1 for high multiplicity event classes except K^0_S, shows the tendency of the produced system to equilibrate with higher multiplicities. Similarly T shows a systematic increase with multiplicity, the heaviest baryons showing the
steepest increase. This is an indication of a mass hierarchy in particle freeze-out. The radius has a tendency to remain constant at high multiplicities. These changes have implicaions for the kinetic freeze-out conditions where the heavy multi-strange hadrons are seen to have an earlier kinetic freeze-out, meaning they come from a smaller volume at a higher temperature. These results show that the Tsallis distribution is an excellent tool to analyze high-energy $p + p$ collisions

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