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The meaning behind observed p_T regions at the LHC energies

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We argue that p_T distribution data from the LHC on the invariant differential yield of the charged primary particles in Pb–Pb collisions at 2.76 TeV with six centrality bins contains several p_T regions with special properties. These distributions were analyzed by fitting the data with exponential functions. We conclude that the regions reflect features of fragmentation and hadronization of partons through the string dynamics. The nuclear transparency results in negligible influence of the medium in the III region (p_T > 17–20 GeV/c), which has highest p_T values. The effects and changes by the medium start to appear weakly in the II region (4–6 GeV/c < p_T < 17–20 GeV/c) and become stronger in the I region (p_T < 4–6 GeV/c). It seems that the II region has highest number of strings. The increase in string density in this region could lead to fusion of strings, appearance of a new string and collective behavior of the partons in the most central collisions. These phenomena can explain anomalous behavior of the Nuclear Modification Factor in the II region. We propose the II region as a possible area of Quark Gluon Plasma formation through string fusion. The first p_T regions are the ones with the maximum number of hadrons and minimum number of strings due to direct hadronization of the low energy strings into two quark systems–mesons.

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