Contribution ID: **279** Type: **Oral report**

Energy and mass dependencies for the characteristics of p_T regions observed at LHC energies

Tuesday, 21 September 2021 17:30 (25 minutes)

The p_T distributions of the K^0- and ϕ - mesons produced in the pp collisions at $\sqrt{s} = 2.76\ TeV$ have been analyzed by fitting them using the exponential function. It was observed that the distributions contain several p_T regions similar to the cases with the charged particles, π^0- and η- mesons produced in the same events. These regions could be characterized using three variables: the length of the region L_K^c and free fitting parameters a_K^c and b_K^c. It was observed that the values of the parameters as a function of energy grouped around certain lines and there are jump-like changes. These observations together with the effect of existing the several p_T regions can say on discrete energy dependencies for the L_K^c , a_K^c and b_K^c. The lengths of the regions increase with the mass of the particles.This increase gets stronger with energy. The mass dependencies of the parameters a_K^c and b_K^c show a regime change at a mass $\simeq 500 MeV/c^2$. According to the phenomenology of string theory, these results could be explained by two processes occurring simultaneously: string hadronization and string breaking. In the experiment we can only measure the spectrum of the hadronized particles, since we cannot access the spectrum of the strings themselves. The string breaking effect could be a signal of string formations and the reason behind the observation of several p_T regions and the jump-like changes for the characteristics of the regions.

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Session Classification: Section 4. Relativistic nuclear physics, elementary particle physics and high-energy physics

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