

To European Strategy Preparatory Group

Project in the
- Physics at High Energy Frontier and
- Strong Interaction Physics

"The QGSM Monitoring of Standard Model Baryon Spectra in High Energy Proton Collisions at LHC."

I would like to suggest an investigation of the distributions of strongly interacting particles that are produced in high energy proton-proton collisions at LHC experiments. This study have to be important as for the Standard Physics researches as for Cosmic Ray studies.

At the energy area of up-to-date experiments in proton-proton collisions there is the peculiarity in the cosmic proton spectrum, well known as "knee", which can be explained with the drastic change in the dynamics of strong interactions at the similar energy or higher. If some monitoring of the spectra of Standard Model baryons would be carried out, someones can conclude about the origin of the knee in the cosmic proton spectrum. In the case of no important changes will be found between the $\sqrt{s} = 900 \text{ GeV}$ and 14TeV , the source of peculiarity is of astrophysical or cosmological nature.

This research can be based on the Model of Quark-Gluon Strings that is very popular in the cosmic ray studies. The spectra of baryons in hadron interactions at high energies had been predicted in this model long time ago:

"Inclusive Spectra Of Baryons In The Quark - Gluon Strings Model".

A.B. Kaidalov, O.I. Piskunova (Moscow, ITEP), 1985. 18pp.

Published in Z.Phys.C30:145,1986.

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More detail consideration of transverse momentum distributions should be done in the framework of QGSM for the low Pt region as well as the comparison of the baryon spectra from different LHC experiments. The collaboration between LHC experimentalists and particle physics phenomenologists is expected, where the cosmic ray scientists are also invited to.

Dr. Olga Piskunova,

P.N. Lebedev Physics Institute of Russian Academy of Science, Moscow

