

Study of cumulative processes in correlation with strangeness and charm production in hadronic collisions at SPS and NICA energies.

Friday, 15 July 2022 10:00 (20 minutes)

STUDY OF CUMULATIVE PROCESSES IN CORRELATION WITH STRANGENESS AND CHARM PRODUCTION IN HADRONIC COLLISIONS AT SPS AND NICA ENERGIES.

S.V. Yurchenko, A.A. Marova, G.A. Feofilov

Saint Petersburg State University, Saint Petersburg, Russia;

E-mail: st098136@student.spbu.ru

New mechanism [1,2] of strangeness and charm production was proposed in high energy hadronic collisions in association with the cumulative particle formation on the flucton. The concept of flucton [3]. - a "droplet" of dense cold nuclear matter, that might be formed in the target nucleus, was motivated by several observations [4-6] of particle production in a so-called kinematically forbidden, in reaction with free nucleons, region. The novel approach [1,2] is based on the joint consideration of the flucton and the relevant formation of strongly overlapping quark-gluon strings. In the last case, the fusion of quark-gluon strings might be responsible for the increased yields of particles containing strange or charm quarks. The first results of studies of possibilities for experimental observations of cumulative particles production that could correlate with strangeness and charm yields, were presented earlier in [7].

In our report we discuss the concept of new, compact detector we propose for registration of cumulative particles as a trigger for studies of correlation with strangeness and charm in the fixed-target experiments at SPS and NICA. We discuss, with the account of cumulative particle yield analysis [8], the estimations of strange and cumulative particle yields, selection of the kinematical regions and some preliminary conclusions about the structure of this compact detector using the Geant4 simulations.

Acknowledgements. This research has been conducted with financial support from St. Petersburg State University (project No 93025435).

References:

1. V. Vechernin, in materials of the IVth Russian-Spanish Congress: Particle, Nuclear, Astroparticle Physics and Cosmology, 4-8 September 2017, JINR, Dubna (Russia), [http://refhub.elsevier.com/S0168-9002\(20\)31065-2/sb3](http://refhub.elsevier.com/S0168-9002(20)31065-2/sb3)
2. V.V. Vechernin, Physics of Particles and Nuclei 52 (4) 604-608 (2021)
3. Blokhintsev D.I., JETP 33 (1957) 1295.
4. G.A. Leksin et al., ZhETF 32, 445 (1957)
5. L.S. Azhgirej et al., ZhETF 33, 1185 (1957)
6. Yu.D. Bayukov et al., Izv. AN SSSR 30, 521 (1966)
7. T.V. Lazareva et al., Bull. Russ. Acad. Sci. Physics, 83(9), 1155-1160. (2019).
8. M. A. Braun and V. V. Vechernin, Theor. Math. Phys. 139 (2004), 766-786

The speaker is a student or young scientist

Yes

Section

1. Intermediate and high energies, heavy ion collisions

Primary authors: YURCHENKO, Semyon (Saint Petersburg State University); MAROVA, Aleksandra (St Petersburg University, Laboratory of ultra-high energy physics); FEOFILOV, Grigory (Saint-Petersburg State University)

Presenter: YURCHENKO, Semyon (Saint Petersburg State University)

Session Classification: Intermediate and high energies, heavy ion collisions