Contribution ID: **17** Type: **Plenary**

KL-Facility

Thursday, May 20, 2021 1:00 PM (30 minutes)

A lot of progress has recently been made in a field of hadron spectroscopy. Intense photon beams complemented by high-resolution hermetic 4pi detectors, supplied with linearly or circularly polarised photons, polarised nuclear targets and ability to detect recoil nucleon polarisation improved our knowledge on excited nucleon states considerably. Most of the progress has been achieved in N*and* Δ areas. A poorly established field of particles with strangeness (hyperons and strange mesons) had little to no benefit from this progress.
We propose to make a significant breakthrough in this field by building novel, high-intensity neutral Kaon beamline at Thomas Jefferson National Laboratory (JLab) to expand accessible strange particle spectrometry programme of Hall-D, rearranging Hall-D with its superior GlueX spectrometer into K_L-Facility, KLF.
In our proposal a powerful electron beam, provided by CEBAF accelerator, will be converted into high-intensity Kaon flux, on the order of 10^4 K_L/s, which exceeds the flux of that previously attained at SLAC by three orders of magnitude! This achievement will allow a broad range of measurements with single-, double- and triple-strange hyperons to be performed with unprecedented statistical and systematical accuracy. The use of a deuteron target, which will complement experiments on hydrogen target, will provide the first measurement ever with neutral kaons on neutrons.
Substantial progress is expected in the field of strange mesons. Besides other things, we expect to solidify famous κ-particle (a strange partner of meanwhile well established σ-meson) and complete lowest lying multiplet of scalar mesons.
In a talk, I will review a current status of the project, major development in the main hardware systems, e.g. Compact Photon Source, Be-Target, Flux Monitor...as well as theoretical development related to the project.

Collaboration

KLF

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Session Classification: Plenary Session