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KLong Facility

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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 Delta* areas. A poorly established field of particles with strangeness (hyperons and strange mesons) had little to no benefit from this progress.

The new Compact Photon Source (CPS) technologies will underpin a major new capability - the production of intense, strange-quark containing hadronic beams in low background regime. The CPS beam intensities will reach up to five orders of magnitude beyond that currently achievable, opening up a wealth of new hadron and nuclear physics perspectives for the future experimental programme. These beams of neutral Kaon mesons (KL) will be the basis of the new K-Long facility (KLF), which will elucidate the strange quark sector of hadron physics with unprecedented precision.

The KLF project aims to discover many new particles in the strange quark sector, elucidate the interaction of strange-quark containing baryons (hyperons) with nucleons and, through the unprecedented Kaon flux of 1 billion Kaons per day enable searches for rare KL decays at new limits. Alongside the hadron physics impact KLF canl deliver key data for fundamental astrophysics including a deeper understanding of neutron star composition and of the early universe during the transition from deconfined plasma to hadrons through the strange epoch.

As well as direct measurement in YN and YNN scattering reactions, many body hyperon forces can be constrained at KLF (at lower nuclear momenta) by accurate hypernuclear information. The energy levels of hypernuclei can be used to constrain models of the (established) hyperon nucleon interaction with various models of three-body (YNN) forces.

In a talk, I will review the 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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