RCNP SEMINAR

Research Center for Nuclear Physics, Osaka University

Speaker Dr. Benjamin Kay (University of York)

Title HELIOS project and it's recent results

Date July 5th (Thurs.) 2012, 16:00 – 17:00

Place Lecture room, 4th floor, RCNP, Osaka University

Abstract:

Probing the structure of short-lived nuclei with single-nucleon transfer reactions is a key focus of existing and emerging radioactive-ion-beam facilities. At Argonne National Laboratory,the ATLAS accelerator provides light neutron-rich beams through the in-flight production method [1] and shortly the CARIBU facility, re-accelerating Cf fission fragments [2]. Studying transfer reactions in this scenario implies they are performed in inverse kinematics where conventional approaches typically suffer from poor resolution due to significant kinematic compression e.g. [3].
The HELIOS spectrometer [4] sidesteps the kinematic-compression problem by transporting the outgoing ions in the strong, homogeneous magnetic field of a large-bore superconducting solenoid.
These ions follow helical trajectories before returning to the magnetic axis, where their energy, position, and time-of-flight are measured---the latter providing automatic, energy independent, particle identification via the cyclotron period of the ion. This opens up many exciting opportunities. An overview of the HELIOS spectrometer will be presented along with results from the first measurements with light neutron-rich beams [5,6,7] and with heavy beams close to Z = 50 and N = 82 [8], along with future directions for the study of neutron-rich nuclei using transfer reactions. The latest prospects for a HELIOS-like spectrometer at a European ISOL facility will be discussed.

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