

Nuclear Physics at CCB

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The IBA Proteus C-235 proton cyclotron at CCB Krakow, where the energy of the proton beam can be varied continuously over the energy range 70-230 MeV, is now intensively used for medical purposes, as the only hadron-therapy infrastructure in Poland. Nevertheless a significant beam time is devoted for basic nuclear physics studies. From March 2016 CCB (together with HIL) belongs to largest European nuclear physics laboratories with Transnational Access granted by the European Union. Beam time is allocated based on the recommendations of the International Advisory Committee.

The main physics cases pursued at the CCB are related to the installed instrumentation, which consists of:

- Big Instrument for Nuclear Data Analysis (BINA), detection setup, which includes a liquid-target assembly, multiwire chamber and scintillation hodoscope. BINA will be used for in-beam experimental investigations of the dynamics of few-nucleon systems: systematic studies of three-nucleon force (3NF), Coulomb and relativistic effects, as well as their mutual interplay in the proton-deuteron system.
- High-energy gamma-ray detection system consisting of an array of eight large volume BaF2 detectors (HECTOR array), which can be complemented with few clusters of the PARIS array and 4 large volume LaBr3 scintillators. It will be used for studies of the structure of high-lying resonance states by inelastic scattering or fusion-evaporation reactions induced by protons.
- KRATTA (Kraków Triple Telescope Array): 35 multi-module telescopes for charged-particle detection;
- Detector testing bench offers possibility of testing the response functions in the wide proton energy range (70-230 MeV) of various detectors, which are the components of large detection systems being installed in other TNA facilities and European infrastructures under construction like FAIR, SPIRAL2, SPES, ELI-NP or HIE-ISOLDE.

In the talk these physics cases and instrumentation will be presented, as well the future plans outlined.