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The cosmic ray detekctor (MCORD) for new NICA-MPD collider.

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The MPD (Multi-Purpose Detector) complex is the main component of the NICA (New Ion Collider fAcility) being built at the Joint Institute for Nuclear Research (JINR) in Dubna, Russia. The experiments conducted at MPD are to complement the research carried out in CERN laboratories. To increase the functionality of MPD, it was proposed to supplement it with an additional muon trigger system. This trigger will be used to calibrate and test other MPD sub-detectors with cosmic ray particles while the accelerator is not producing the experimental beam. Additionally, the trigger can be used as a Veto detector to reject cosmic rays background during experiments. A group of Polish scientists from the NICA-PL Consortium was invited to design and construct it. It was proposed to surround the MPD detector with an additional cylinder-shaped cosmic ray detector called MCORD (MPD COsmic Ray Detector). The MCORD will be based on long (1.6 m) plastic scintillators with silicon photomultiplier (SiPM) for light reading and an FPGA electronics for the analysis of the obtained signals. The MCORD detector was designed also to be used for astrophysical observations of extended air showers (EAS), especially for central part of it. It will enable the registration of multi-muon events. Due to its design, it enables the analysis of signals from any direction in relation to the zenith and horizon. This feature makes it a unique tool of this type in the world. The potential goals of these observations may be to try to explain the GZK-cutoff problem by trying to identify the sources of extremely high energy primary particles.

Authors: Dr BIELEWICZ, Marcin (NCBJ / JINR); SWIDERSKI, Lukasz (National Centre for Nuclear Research (NCBJ)); MIANOWSKI, Slawomir (National Centre for Nuclear Research); RYBCZYNSKI, Maciej (Jan Kochanowski University, Kielce, Poland); KANKIEWICZ, Pawel (Institute of Physics, Jan Kochanowski University, Kielce); Mr WÓJCIK, Kamil (Institute of Physics, University of Silesia); KOPEĆ, Natalia

Presenter: Dr BIELEWICZ, Marcin (NCBJ / JINR)

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