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DEVELOPMENT OF COMPTON CAMERA FOR MEDICAL PURPOSES BASED ON HYBRID DETECTOR TIMEPIX3

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Among interactions of gamma ray with matter, Compton effect plays the leading role in the case when the energy of gamma ray exceeds a few hundred keV. At the same time, unless conventional gamma cameras that are used in CT scans, Compton cameras do not need collimators, that provides higher registration efficiency at several times. However, Compton cameras are not yet used for medical purposes because of its low spatial resolution. Recent advances in construction of new generations of detectors allowed the development of Compton cameras with improved spatial resolution. This has an important role for building CT scans used for registering isotopes that emit high-energy gamma radiation, and therefore allows expanding of the list of radiopharmaceuticals used in medicine. In this work, based on hybrid detector Timepix3, Compton camera was developed, along with algorithms to reconstruct and enhance image quality, allowing exceeding spatial resolution of 5mm.

Primary authors: HOAI BAO PHI, TRUONG (JINR Dzhelepov Laboratory of Nuclear Problems); ROZHKOV, Vladislav

Presenter: HOAI BAO PHI, TRUONG (JINR Dzhelepov Laboratory of Nuclear Problems)

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