# Relativistic Electron Channeling Radiation for Photonuclear Reactions Studies

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As is known, the channeling radiation (CR) spectrum for sub-GeV–several GeV electrons is characterized by a sharp maximum at photon energies up to several MeV, which is enough to excite separate nuclear levels as well as (γ,n) reaction in the downstream target. This maximum may even reach the region of giant dipole resonance for heavier nuclei. At equal radiator thickness the CR flux exceeds in more than one order that of bremsstrahlung. Thus, CR can be efficiently utilized in studying photonuclear reactions as well as generating pulsed neutron beams at sub-GeV electron accelerators.The non-trivial dependence of neutrons yield from the downstream light (D and Be) targets on the energy of incident electron beam and on the electron beam alignment with respect to the crystal channeling planes (first target) recently was reported in /1/.

Here, we study the features of (γ,n) reaction excited by CR from axially channeled sub-GeV–several GeV electrons. The CR spectra are simulated using the BCM-2.0 code /2/. The (γ,n) reactions cross-sections are taken from /3/. The detailed calculations of the neutrons yield from light (D and Be) and heavy (Au, Pb, U) targets irradiated by axial CR are presented.

REFERENCES

1. O.V.Bogdanov, S.B.Dabagov, Yu.L.Pivovarov // Nucl. Instrum. Meth. B (2020) 785, 347.
2. S.V.Abdrashitov, et al. // Nucl. Instrum. Methods B(2017) 402, 106sinp.msu.ru/index.en.htmlDATA
3. Centre for Photonuclear Experiments Data. Lomonosov Moscow State University, Skobeltsyn Institute of Nuclear Physics. <http://cdfe.sinp.msu.ru/>