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## **Design and Development of Inverse Compton Scattering Hard X-Ray Source Based on Linear Accelerator of Polish Free Electron Laser (PoIFEL)**

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The electrons, which passed the undulators in a linac-driven Free Electron Lasers, could be utilized for additional radiation generation in an Inverse Compton Scattering process (ICS). The PoIFEL, facility, currently in preparatory phase in NCBJ, is planned to be equipped with ICS system, to generate continuous (10kHz repetition rate) pulses train of hard X-ray radiation, in addition to THz-, VUV- and IR-light produced in FEL process. Taking into account the principles of Compton scattering, we designed the interaction chamber to assure head-on collision of electrons and optical photons and an X-ray detection system. To simplify the setup, we designed to use similar type of laser source for ICS system, as for photocathode excitation. The energy of generated X-rays, calculated on the basis of laser and linac parameters are in range between 115 keV and 1.9 MeV. The maximum number of X-ray photons is estimated to reach about  $3 \times 10^6$  photons per mrad<sup>2</sup> per second. In the paper, the design of ICS interaction chamber, detectors, and also calculated X-ray photon characteristics will be presented.

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### **Footnotes**

### **I have read and accept the Privacy Policy Statement**

Yes

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