

MEPHI'S OPTION OF LAB SCALE COMPTON SOURCE

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A development and construction of comparatively cheap and compact (several meters scale) X-ray sources is possible with the help of inverse Compton scattering of laser photons on an electron bunch. Such sources can be used in the field of materials science (new materials, diagnostics of nanostructures at the atomic level), research of nano- and biosystems, medicine and pharmacology (new drugs R&D), physics and chemistry of fast-flowing processes (burning, explosion). It is suggested that compact storage synchrotron will operate with normal conducting S-band top-up linac. Linac will provides bunches with tunable energy in the range of 20-60 MeV to generate the photon flux with tunable energy [1, 2]. The use of a storage ring provides the following advantages: comparatively high average intensity of the generated photon flux, high brightness, photon beam energy tuning in a wide range, high degree of monochromaticity and coherence of the generated photons. There are current results of the design of a compact storage ring for generating the photons in the energy range of 5-30 keV and investigations of the development of relativistic picosecond electron beam dynamics instabilities in the report.

1. V. S. Dyubkov et al., Beam dynamics investigation for a new project of compton back scattering photon source at NRNU MEPhI // 12th IPAC, May 2021, Online, Brazil. MOPAB042.
2. V.S. Dyubkov, S.M. Polozov, Storage ring design and beam instabilities investigation for MEPHI's photon source // Proc. of RuPAC 2021, Alushta, Russia, 2021, P. 277-279.

The speaker is a student or young scientist

No

Section

1. Synchrotron and neutron radiation sources and their use in scientific and applied fields

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