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Thomson X-ray source: basic principles and applications

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Laser-electron X-ray source based on Thomson scattering is a novel type of laboratory high spectral brightness X-ray sources [1]. Recent advances in high power laser system and electron accelerator technologies have enabled a development of these compact facilities that are able to produce a synchrotron-quality X-ray radiation for material and life science studies, cultural heritage related investigations and many other fields [2-4] at a highly specialized local laboratory. Additional opportunities provided are tight laser/X-ray delay control needed for dynamic studies and tunable spectral properties of theX-ray beam. Besides, the Thomson X-ray source is also known to be the only way to produce monochromatic high energy photon beam s (up to 10 MeV) for continuous sp ectral scan s in nuclear photonics exp eriments. This talk presents the main principles, schem es and current directions of the Thomson X-ray source development, with a special attention being paid to the current projects on the subject in the Institute.

References

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Short Bio: After graduation from Moscow Engineering and Physics Institute (MIFI), Igor Artyukov joined P.N.Lebedev Physical Institute RAS (Moscow, Russia) in 1991. He received his PhD in Optics in 1993 from the same institute. He worked as visiting scientist at Colorado State University (USA) and as visiting professor at Tohoku University (Japan). Since 2014 he holds the position of Head of X-ray Optics Laboratory. He is a co-author of more than 200 scientific publications.

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