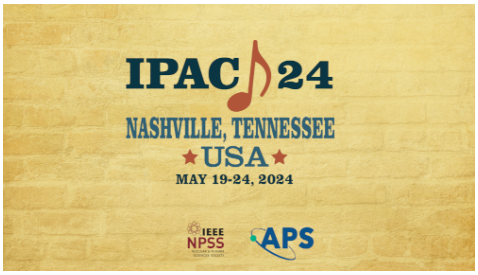

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Measurement of the spatial distribution of inverse Thomson scattered gamma rays generated by an axially symmetric polarized laser

Wednesday, 22 May 2024 16:00 (2 hours)

Inverse Thomson (Compton) scattering is a well-known radiation process that produces high energy and highly polarized gamma rays using a high energy electron accelerator. Linearly polarized gamma rays are generated by the interaction of a linearly polarized laser and an electron beam, while circularly polarized gamma rays are generated by a circularly polarized laser*. On the other hand, it is also possible to generate radially or azimuthally polarized lasers whose polarization direction is radially or azimuthally distributed. These are called axially symmetric polarized beams because the polarization distribution is symmetric about the optical axis. A space variant waveplate, s-waveplate, was used to convert a linearly polarized laser into an axially symmetric polarized laser. The polarized lasers were collided with a 750 MeV electron beam of the UVSOR synchrotron facility, and the spatial distribution of the generated 6.6 MeV gamma rays was measured using a radiation imaging detector with a 1-mm-thick CdTe sensor (AdvaPIX TPX3). It was found that the spatial distribution of gamma rays generated from axially symmetric polarized lasers is different from that of linearly and circularly polarized gamma rays. In order to clarify the polarization state of these gamma rays, the spatial polarization distribution of the gamma rays will be measured in the near future. In this conference, the detail of the experiment will be presented.

Footnotes

- Y. Taira et al., "Measurement of the spatial polarization distribution of circularly polarized gamma rays produced by inverse Compton scattering", Phys. Rev. A 107 063503 (2023).

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