Contribution ID: **23** Type: **Oral presentation using Zoom**

Neutron Production at the ILC

Wednesday, 27 October 2021 16:42 (24 minutes)

Neutrons are widely used for material sciences, imaging, fundamental physics and so on due to its unique properties. Recently, spallation neutron sources using megawatt class accelerators are coming up as next-generation neutron sources instead of research reactors. A spallation neutron source irradiates proton beam with energy of a few GeV into a neutron spallation target made of a heavy elemental material. Neutrons are produced via spallation reaction with kinetic energy of several MeV, and were cooled down in a moderator to 1˜100 meV, which are commonly used as cold or thermal neutrons. Produced neutrons have pulse structure. This nature is applied for TOF analysis, which is essentially outperform reactor neutron sources. However, the spallation neutron source needs huge neutron shield about 10-m diameter. It makes the neutron facilities large and costly, and also prevent to approach by the neutron source. Since both neutron target and accelerator are closing to the engendering limit, higher power neutron sources are getting more difficult. Thus, more effective way to produce neutrons is expected.
Photo-neutron production reaction using pulsed gamma beam can be a candidate of a new neutron source which works without moderator to realize short timing and compactness[1]. The International Linear Collider (ILC) is a proposed electron-positron collider whose collision energy is 200-500 GeV [2]. It is planning to build a positron source using pulsed gamma rays generated by 150-250 GeV electron beam through a helical undulator. In this talk, I will report an evaluation of its performance of the photo-neutron source using the gamma rays and possible applications.

[1] Y. Iwashita et al., "DIVERSIFIED APPLICATION OF ILC", Proceedings of IPAC2018 9th International Particle Accelerator Conference (2018).
[2] Behnke, Ties, et al. "The International Linear Collider Technical Design Report-Volume 1: Executive Summary." arXiv preprint arXiv:1306.6327 (2013).

1st preferred time slot for your oral presentation

13:00-15:00 JST (6:00-8:00 CEST, 0:00-2:00 EDT, 21:00-23:00 PDT)

2nd preferred time slot for your oral presentation

15:30-17:30 JST (8:30-10:30 CEST, 2:30-4:30 EDT, 23:30-1:30 PDT)

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Session Classification: S: ILC application (to physics, material science, etc.)

Track Classification: Parallel sessions: Accelerators: Session S: ILC application (to physics, material science, etc.)