Contribution ID: **2175** Contribution code: **THPL157** Type: **Poster Presentation**

Study on transverse beam size measurement using Cherenkov diffraction radiation in low-energy electron accelerator

Thursday, 11 May 2023 16:30 (2 hours)

Cherenkov Diffraction Radiation (ChDR), which is emitted when relativistic charged particles pass around dielectric materials, has recently been presented as non-invasive beam diagnostics in various studies. We intend to measure transverse beam size using ChDR in e-LABs, a 100 MeV electron experimental accelerator at the Pohang Accelerator Laboratory (PAL). The electron energy of e-LABs is low, so the intensity of photons generated by ChDR is absolutely small. Therefore, a cumulative dielectric radiator with a length of 157 mm was designed to increase the photons incident on the detector. This contribution shows the characteristics of ChDR simulated numerically at low energies. Furthermore, we present an experimental configuration for measuring transverse beam size with some considerations.

Funding Agency

This work was supported by the National Research Foundation of Korea (NRF) grant funded by the Korea government (No. RS-2022-00154676).

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Session Classification: Thursday Poster Session

Track Classification: MC6: Beam Instrumentation, Controls, Feedback and Operational Aspects: MC6.T03: Beam Diagnostics and Instrumentation