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Progress on Gas-Sheet Beam Profile Monitor

Tuesday 9 September 2025 16:00 (2 hours)

A non-invasive photon-detection beam profile monitor using a gas sheet, named the gas sheet monitor, has been developed. Our gas sheet is formed based on rarefied gas dynamics. To obtain a beam profile quantitatively, we have also devised a beam reconstruction method with a response function measurement method. These methods gave a 2-D beam profile of a high-intensity 3 MeV beam at the J-PARC RFQ test stand, which well agreed with a simulated 2-D profile by a particle-in-cell code and 1-D profiles measured by a wire-scanner monitor. As the next step, measurement of a 400 MeV hydrogen negative ion beam at the end section of the J-PARC Linac was challenged. Since a high-energy beam rarely interacts with a gas due to the small cross-section and induces an intense radiation noise, the captured image had a very low signal-to-noise ratio though the beam-induced signal was detected. Through some measurements, it was found that the primary noise was a radiation directly acting on a built-in multi-channel plate of an image intensifier. We will reports the details of these recent efforts on the gas sheet monitor.

Footnotes

Funding Agency

I have read and accept the Conference Policies

Yes

Author: YAMADA, Ippei (Japan Atomic Energy Agency)

Presenter: YAMADA, Ippei (Japan Atomic Energy Agency)

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