IBIC2024 - 13th International Beam Instrumentation Conference



Contribution ID: 8 Contribution code: WEBI1

Type: Invited Oral Presentation

Achieve a record dynamic range of halo diagnostics with a novel fluorescence wire scanner

Wednesday, 11 September 2024 10:50 (30 minutes)

Achieving sustainable beam operation in high-power accelerators requires careful control and minimization of halo-particle-induced beam loss. To accomplish this, it is important to have a clear understanding of the halo-particle distribution. While state-of-the-art instruments can achieve a dynamic range of ~10^6 with counting readout schemes, a novel fluorescence wire scanner combined with a conventional metal wire has recently been proposed and demonstrated at CSNS. This new approach has achieved a sensitivity at the single-particle level and a dynamic range of over 10^8. A 100x1x0.15 mm³ Chromox fluorescence wire has been prepared at CSNS, which has demonstrated excellent light yield and radiation hardness. By capturing fluorescence images with a CMOS camera in a dark environment, a new record dynamic range of about 6x10[°]8 has been achieved. Continue efforts on optimizing the fluorescence wire, observation system, and sensor hold promise for further improvements in dynamic range and sensitivity.

Footnotes

Funding Agency

I have read and accept the Privacy Policy Statement

Yes

Primary author: YANG, Renjun (Institute of High Energy Physics)Presenter: YANG, Renjun (Institute of High Energy Physics)Session Classification: WEB: Transverse Profile and Emittance Monitors

Track Classification: MC4: Transverse Profile and Emittance Monitors