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First beam commissioning and beam experiments of the CiADS Front end

Tuesday 27 August 2024 16:00 (2 hours)

The China Initiative Accelerator Driven System (CiADS), a multi-purpose facility driven by a 500 MeV superconducting RF linac, is currently under construction in Huizhou, Guangdong. In order to ensure the stable operation of the superconducting linac, we conducted optimization research on the beam quality in the front-end section of CiADS. By using the point scraping method, part of the beam halo particles are removed in advance at the entrance of the LEBT, avoiding the generation of beam halo particles. On the other hand, since the beam extracted from the ECRIS contains a portion of H^{2+} and H^{3+}particles, impurity particles may lead to a decrease in the transmission efficiency of downstream accelerators. By separating the mixed beam, it is possible to measure the proportion and phase space distribution of the mixed beam at the exit of the ion source, thereby achieving accurate measurement of the proton beam. This paper mainly outlines the first beam commissioning of CiADS Front end. Additionally, the effectiveness of the point scraping method has been verified through transverse emittance measurement, and the proportion and phase space distribution of the mixed beam was measured. Furthermore, the stability of the ion source was tested, and the centroid shift of the ion source extracted beam was measured.

Footnotes

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