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A novel approach to qualify the straightness of electrostatic septa for the SPS slow extraction

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The quality of slow extraction from the SPS (Super Proton Synchrotron) to the North Area is critically influenced by the straightness tolerance of the electrostatic septum. Past observations have identified a degradation of the anode body straightness, resulting in an increased beam loss during extraction. A new metrology bench including optical sensors has been developed to cope with the tolerance requirements while also allowing process automation. Two distinct measurement procedures are currently employed: one for the anode noses and another for the individual wire metrology. A control system was developed to automate the metrology and analysis process, allowing operator and time-independent measurements and increasing process accuracy. Additionally, the studies explore the straightness impact of Bessel point supports compared to the currently applied anode support in the extremity planes. The findings from these investigations provide accurate information for performing corrective machining of the anode body, aiming to improve the overall anode straightness, resulting in reduced beam loss during the slow extraction process.

Footnotes

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