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Design and Implementation of an Online Beam Current and Stability Monitor for the UMCG-PARTREC AECR Ion Source

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At UMCG-PARTREC, formerly known as the KVI institute, a beam intensity and stability monitor has been developed for the AECR ion source setup. This monitor measures a small fraction of the analyzed beam current parasitically, utilizing inherent beam aberrations. The beam current and its stability are presented to the user via a LabVIEW Graphical User Interface (GUI), which also displays plasma and ion-optical variables. The GUI is designed to facilitate the easy correlation of beam fluctuations with plasma fluctuations or with beam optical changes in the analyzing section. Additionally, this GUI has been integrated into the main control system and is actively used by operators of the superconducting cyclotron AGOR. This tool is particularly beneficial for operators, providing continuous online beam current monitoring throughout the beam development process. The present article details the construction of the monitor device, including its wiring, sampling, and analysis processes. Also, it covers the GUI and provides an outlook on potential applications of this tool.

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