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Research and Development Activities to Increase the Performance of the CAPRICE ECRIS at GSI

At GSI the CAPRICE ECRIS is in operation to deliver high-charge state ion beams from gaseous and metallic elements to the accelerator facility. In order to fulfill the demand for higher intensity and stability of high-charge state ions, a test campaign has been carried out at the ECR test bench. The objective of the measurements was the enhancement of ion source performance in terms of extracted current and charge states of gaseous and metallic ion beams in CW mode and in pulsed mode by tuning the ion source parameters.

The ion beam stability has been monitored by an optical emission spectrometer (OES) which has been used to check the plasma and the temperature of the resistively heated oven. The OES has been already used as a diagnostic tool for ion source monitoring during metal ion beam operation in particular for Ca ion beams. During the test campaign, it has been investigated that the OES can be used for monitoring the stability of ion beams from gaseous elements, as well.

The main achieved results during the measurement campaign are reported.

The ion beams extracted from the CAPRICE ECRIS have been simulated with a particle tracking code in order to study and improve the beam matching into the RFQ. The preliminary results of this study together with the possible modification of the extraction column are presented.

Funding Agency

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Yes

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