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A New Extraction System Design with a Strongly Inhomogeneous Electric Field for a JYFL Electron Cyclotron Resonance Ion Source

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A new ECR ion source extraction system has been designed. The design is based on the extraction conditions of the JYFL 14 GHz ECRIS, and its performance is compared to the existing extractor. The new design aims to improve the beam formation and beam quality of high intensity ion beams.

The plasma and the puller electrodes shape was changed. The plasma electrode has a narrow tip extruding towards the puller. It causes the redistribution of the electric field in the extraction region.

The extractor was developed with IBSimu. The initial beam parameters were taken from the experimental data. The calculations showed that the new extraction system allows to increase the total current without compromising the beam quality. The new design allows the beam formation optimization for lower extraction voltages overcoming the present space charge limit.

E-mail for contact person

vybinss@ipfran.ru

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Primary authors: KOIVISTO, Hannu (University of Jyväskylä); Dr IZOTOV, Ivan (IAP RAS); Mr VYBIN, Sergey (IAP RAS); TARVAINEN, Olli (STFC Rutherford Appleton Laboratory); Dr SKALYGA, Vadim (IAP RAS); TOIVANEN, Ville (University of Jyväskylä)

Presenter: Mr VYBIN, Sergey (IAP RAS)

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