

INFLUENCE OF INITIAL PLASMA DENSITY AND MEAN ELECTRON ENERGY ON THE PREGLOW EFFECT

I. Izotov[#], A. Sidorov, V. Skalyga, V. Zorin, IAP/RAS, Nizhny Novgorod, Russia
H. Koivisto, O. Tarvainen, V. A. Toivanen, University of Jyvaskyla, Finland

Abstract

The investigation of the Preglow effect is driven with the aim of creating a short-pulsed multicharged ion source. Recent experimental investigations have revealed strong influence of seed electrons, i.e. initial plasma density, on the amplitude and duration of the Preglow peak [1]. Present work, consisting of experiments and simulations, is dedicated to further investigation of the Preglow dependence on initial plasma density and electrons energy. Experimental investigation was performed at University of Jyvaskyla (JYFL) with the A-ECR type ECRIS operated with 14 GHz frequency. Helium was used for the study. An initial ionization degree of the gas was varied by changing the pulse duration and duty factor. Time-resolved ion currents of

He⁺ and He²⁺ were recorded. Calculations were made by using 0-dimensional model described in references [2], [3] and based on the balance equations for the particles confined in the magnetic trap. Results of simulation are compared with experimental Preglow peaks and discussed. Good agreement between experimental data and simulation encourages us to conduct a further study, aimed at optimizing the Preglow by tuning source parameters and initial plasma conditions.

[1] O. Tarvainen et al. R.S.I., 81, 02A303, 2010

[2] T. Thuillier et al. R.S.I., 79, 02A314, 2008

[3] I. Izotov et al. IEEE Trans. Plasma Sci. 36, 1494, 2008.

Paper not received

[#] izotov@appl.sci-nnov.ru