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The electrostatic deceleration of ions injected into an ECRIS CB plasma

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The capture of the 1+ beam is a key parameter in the charge breeding process with an ECRIS-Charge Breeder as it greatly influences the 1+N+ conversion efficiency. The shape of the efficiency vs incident ion energy « Delta V » curve originally led to the theory of slowing down of the injected ions essentially by cumulative small-angle scatterings in collisions with the buffer gas ions. Recent experiments carried out with the PHOENIX charge breeder at LPSC tends to show that the electrostatic deceleration plays a greater role than historically considered. For this study, we varied the CB plasma potential by acting on the microwave power parameter and by measuring the optimum injection energy for sodium, rubidium and cesium ions. Both i) the correlation between the plasma potential and optimum injection energy parameters and ii) the independence of the optimum energy value as a function of the incident ion mass support the new model based on a slowing down essentially electrostatic.

Footnotes

Funding Agency

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Yes

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