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Effect of Negative Ion Sheath on Beam Extraction in Negative Hydrogen Ion Sources

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The shape of a negative ion emitting surface (plasma meniscus) near the extraction aperture is important for the beam quality of the H^- ion beams from H- ion sources. A lot of H^- surface-production cause the ion-ion sheath, which can affect meniscus shape. In this study, effects of H^- surface-production and the ion-ion sheath structure on the meniscus are numerically investigated by 3D PIC model KEIO-BFX code [1].
KEIO-BFX simulation has shown that with increasing in the surface-produced H-, the ion-ion sheath forms near the extraction aperture and it prevents the penetration of the extraction electric field. In the presentation, more detailed analysis, such as the dependence of the ratio nH^-/ne will be discussed.

[1] S. Nishioka, et al., J. Appl. Phys. 119 (2016) 023302.

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