

Abstract Submitted  
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**Challenges in plasma and extraction modelling of negative ion sources** TANELI KALVAS, University of Jyvaskyla — The physical processes taking place in negative ion source plasmas are modelled by state-of-the-art 3D particle-in-cell (PIC) codes. These codes are used to gain understanding and to find optimal solutions for negative ion beam production. The PIC codes can be made to match to the reality if all relevant processes were included. This is unfortunately limited by the availability of data about the processes and the huge amount of computational resources needed for the simulations. The optimization of the extraction system and beam transport ion optics is often made using computationally less intensive methods utilized in so-called gun codes. These codes use simplified plasma models to provide a starting point for the extracted beams being simulated. The relatively fast computation allows systematic studies, which are not practical with PIC codes. The gun codes often match well to reality, but they do have difficulties reproducing some effects, especially in negative ion extraction, due to the approximations made in the plasma model. Could the future solutions for beam production modelling couple the two types of simulations?

Taneli Kalvas  
University of Jyvaskyla

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