

## **Simulation of the gas density distribution in the accelerator of the ELISE test facility**

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Abstract:

In multiaperture electrostatic accelerators of negative ion sources, the plasma discharge is sustained by injecting gas in the plasma source, in a dynamic equilibrium with the gas flowing out through the accelerator. In this work, we present a three-dimensional numerical simulation of the gas flow inside the accelerator system of the large negative ion source ELISE at Max-Planck-Institut für Plasmaphysik Garching. ELISE has 640 apertures per electrode and lateral gaps between the electrode support structures that also contribute to the total gas conductance. Assuming molecular regime, we estimated the gas conductance, the gas density profile along the path of the ion beams from upstream of the plasma grid to downstream of the ground grid, and the transverse non uniformities in the accelerator. The simulation included the most relevant geometrical features, while the results are compared to analytical results.