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Characteristics and Experiment Measurement of Cascaded Plasma In Linear Plasma Devices

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Finite numerical simulation on plasma generation, confinement and distribution, is lacked in design and research of linear plasma devices. As a high density plasma source, cascaded arc plasma is widely used in plasma and material interaction devices. In this paper, a high-density linear plasma device with cascaded arc source is developed, which plasma parameters and distribution is analyzed by COMSOL Multiphysics. The simulation results show that for argon arc discharge, with magnetic field 2000Gs on axis, argon gas flow 100cm³/s, 80A between cathode and anode, plasma density with distance of 200mm from anode is $1.42 \times 10^{22} \text{m}^{-3}$, and the election temperature is 1.15eV. To validate the model, results are compared with the experimental findings, in which Langmuir probe is adapted to discover plasma parameters, agreed with the numerical simulation well. Research result can provide references for engineering design.

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