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**Design of a Hollow-Anode Discharge Source for Generation of Supersonic Plasma Jets** IN JE KANG, SOON GOOK CHO, MIN KEUN BAE, SUNG KIU JOO, JIN WOO KIM, HYUNG JIN KIM, KYU SUN CHUNG, Hanyang University, CENTER FOR EDGE PLASMA SCIENCES TEAM — A hollow-anode discharge source was developed to produce supersonic plasma jets for various astrophysics applications. It not only provides the high density of the high-energy electrons in the hollow node region due to beam-like properties of the electron stream and focusing of the concave cathode, but also is able to easily control generating power according to applied input power. We have simulated the geometry of a plasma source by considering uniform density discharge model at a simple cylindrical structure, and have estimated the plasma parameters, such as electron temperature (Te) and plasma density (ne), with source geometry, applied power and pressure. Te is determined from particle balance by equating the total surface particle loss to the total volume ionization, while ne at the central region of source is calculated from energy balance by equating the total power absorbed to the total power lost. To perform supersonic plasma flow, the nozzle of a hollow-anode discharge source has been simulated by computing the flow using the one dimensional equations for the isentropic flow of ideal gas, and the Rankine-Hugoniot relation of normal shock waves for ideal gases.

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