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Measurement of Instability in the Hot-Cathode Penning Ion Gauge Ion Source

In this study, plasma parameters and instability were measured using a single Langmuir probe in a hot cathode Penning ion gauge ion source. Experiments were performed with argon gas at an operating pressure of 1 mTorr. We observed an increase in electron temperature corresponding to an increase in discharge current. At the same time, we noted an increase in plasma instability with increasing discharge current, and this instability caused nonlinearity in the relationship between discharge voltage and electron density. The electron density was highest around 80 V at low discharge currents, and the highest electron density was observed at higher discharge voltages with low instability amplitudes at high discharge currents. These phenomena demonstrate that the instability affecting the diffusion of electrons perpendicular to the magnetic field is strongly correlated with electron density and temperature, which in turn can affect the ion species and the ion beam current.

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Yes

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