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Effect of Cathode Geometry on Magnetically Coupled Hollow Cathode Plasma Source

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A direct current (dc) plasma source consisting of hollow cathode geometry and a constricted anode is presented. The effect of a hollow cathode geometry on radial density distribution of a magnetized plasma column has been studied in a low-pressure (approximately 1.4Pa) argon discharge. The plasma column is characterized using Langmuir probe and the radial density distribution for two different 'inside' profiles of a hollow cathode is discussed. Probe measurement indicates that conical-profile hollow cathode produces a plasma column with centrally peaked plasma density whereas cylindrical-profile hollow cathode forms plasma column with off-centered density peak. Thus overall dynamics of perpendicular and oblique cathode sheaths behind the sustenance of magnetized plasma column has been discussed.

Keywords:- constricted anode, conical hollow cathode, cylindrical hollow cathode, Langmuir probe, magnetized plasma column, radial density distribution, oblique cathode sheaths.

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