Abstract Submitted
for the GEC18 Meeting of
The American Physical Society

Magnetic field induced anode sheath transition in modified hollow cathode discharge RAMKRISHNA RANE, KUSHAGRA NIGAM, P BHARATHI, ALPHONSA JOSEPH, SUBRATO MUKHERJEE, Institute For Plasma Research — The present work reports on the study of the anode sheath behaviour in the magnetically enhanced hollow cathode plasma. A uniform magnetic field in the range of 0 to 50 Gauss induces a change in the potential which results in the transition from ion to electron sheath. The global plasma response to this transition is investigated using Langmuir probe and Optical Emission Spectroscopy. A systematic study showed that during the transition, the electron temperature increases and plasma density decreases in the bulk plasma. The emission spectra of the plasma showed the presence of strong atomic and ionic lines of Argon. The intensity of these spectral lines showed a dip during the transition between two sheaths. The discharge showed an onset of anode spot or fireball at critical magnetic field. The plasma potential locks on to the ionization potential of argon gas when anode spot is completely formed. Further, oscillations of the order of 5-20 KHz frequency are observed in the floating potential due to the extra ionization and excitations in the electron sheath. The reason of the electron sheath formation at particular magnetic field is attributed to the reduction of the electron flux reaching to the anode in the direction perpendicular to the magnetic field

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Date submitted: 14 Jun 2018 Electronic form version 1.4