Abstract Submitted
for the GEC18 Meeting of
The American Physical Society

Basic characteristics of low temperature DC magnetized plasmas in a weakly collisional magnetic X-point configuration YEGEON LIM, BIN AHN, DAEHO KWON, WON-JUN LEE, Department of Nuclear and Quantum Engineering, KAIST, SE YOUN MOON, Department of Quantum System Engineering, Chonbuk National University, BO-SUNG KIM, I.T.S., YOUNG-CHUL GHIM, Department of Nuclear and Quantum Engineering, KAIST — We have constructed a cylindrical multidipole chamber, MAXIMUS (MAgnetic X-point sIMUlator System), with a DC discharge system capable of generating variable magnetic X-point configurations. MAXIMUS is composed of two connected cylindrical chambers of 60cm in diameter and 1m long each where one chamber is grounded and the other can be electrically biased. We generate H, He or Ar discharges at working pressures between 0.1 mTorr and 100 mTorr. Plasmas are generated by energetic ionizing electrons emitted from a set of heated ThW filament wires, which can be biased up to -200V. The emitted electron current can be varied up to ˜10A in a specific condition. Langmuir probes and emissive probes are used to measure electron temperature, plasma density and plasma potential. We use Hall probes to measure spatial profiles of magnetic fields. Typical plasma parameters generated in MAXIMUS are T_e˜1eV, n_e˜10^{10}cm^{-3} and V_p˜5V. The magnetic X-point is generated via parallel DC currents (up to 1kA) through two axial copper tubes in MAXIMUS. Magnetic field configurations are varied by changing relative positions and driving currents of the copper tubes independently. Influences of magnetic perturbations and neutral densities on plasmas in the X-point configuration are initially investigated.

Yegeon Lim
Department of Nuclear and Quantum Engineering, KAIST

Date submitted: 17 Jun 2018 Electronic form version 1.4