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Investigation on electron drift motions of low temperature DC plasmas in Magnetic X-point sIMUlator System, MAXIMUS. YEGEON LIM, BIN AHN, YONG SUNG YOU, YOUNG-CHUL GHIM, Korea Advanced Institute of Science and Technology — We present electron drift motions in MAXIMUS (MAgnetic X-point sIMUlator System), where low temperature DC plasmas with tokamak-like poloidal magnetic fields are generated. MAXIMUS is a linear multidipole chamber (2.0m long and 0.6m in diameter) with a pair of axially installed water-cooled copper tubes generating tokamak-like poloidal magnetic fields by running DC currents (up to 1kA each) through them. We use negatively biased hot thoriated tungsten filaments to generate DC plasmas, and the filaments are placed around the upper copper tube. Such a novel plasma source generates dense plasmas in the core region (around the copper tube) with a radial electron pressure gradient whose scale length is approximately 1 cm. It is apparent that the electron drift motions due to grad-B and curvature of the fields are playing a significant role as the plasmas are only generated in the direction of the electron drifts. Using a one-sided planar Langmuir probe, we measure and report electron velocity distribution functions including the effects of grad-B and curvature drifts which lead to asymmetric distribution functions in the velocity space.

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