The Effect of Magnetic Field on the RF Collisional Sheath

YING WANG, XIANZHU TANG, Los Alamos National Laboratory, T-5 TEAM — The Chodura sheath has been widely studied for decades. For an oblique magnetic field, there exists in front of the Debye sheath (of thickness several Debye length, in front of the solid surface) a Chodura sheath, also known as the magnetic pre-sheath, of thickness several ion Larmor radius. A 1D particle-in-cell (PIC) code [1] with Monte Carlo collision methods is upgraded for the magnetic field with arbitrary angles. The effect of the magnetic field on RF sheath parameters, such as ion fluxes to the surface and ion/neutral energy and angular distributions, is investigated. A special attention is given to the angles of a few degrees between the magnetic field and the surface. The PIC simulation results are compared with the self-consistent analytical RF sheath model [2] for the magnetic field parallel to the surface.