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Magnetically insulated baffled probe for measurements in the edge plasma of tokamaks

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A magnetically insulated baffled (MIB) probe offers the advantages of direct measurements of the plasma parameters (including plasma potential, electron temperature and ion temperature etc.), while being non-emitting and electrically floating[1].The MIB probe was constructed by retracting the conducting plug of a classical Langmuir probe inside an insulating tube placed perpendicular to the magnetic field lines. The retracting distance of the collector inside the ceramic tube was estimated assuming classical and anomalous mechanisms of the electron cross-field diffusion and taking into account particles losses inside the tube. The results of the MIB probe measurements in a HMHX (High Magnetic field Helicon experiment) (typical plasma parameters: electron density >1013 cm-3 for Ar helicon plasma discharge at magnetic field up to 6300 G) are presented. The MIB probe designs proposed for edge diagnostics will increase the capability to characterize separately plasma properties in real-time for understanding of underlying physics in the edge plasma of tokamaks (EAST).

Keywords: helicon-wave excited plasma, plasma potential, MIB probe

Reference:
[1] V. I. Demidov et al., Rev. Sci. Instrum. 81, 10E129 (2010).

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