

Plasma Potential Measurements in the edge region of ADITYA –U Tokamak using Reciprocating Laser Heated Emissive Probes

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Laser Heated Emissive Probes (LHEP) have several advantages over conventional filament emissive probes and serve as a tool for direct measurement of plasma potential. Measurement of plasma potential or Electric fields component perpendicular to magnetic field are necessary for fundamental understanding of plasma parameters, transport mechanisms, space charge distribution in plasmas. Owing to complexities of tokamak geometries and high temperature magnetically confined environment, very few attempts have been made for using emissive probes on such complex devices. Here we present a novel design of the LHEP for ADITYA – U tokamak involving radially movable probe shaft with dual probe tip provision made up of LaB6. CW CO₂ laser at 10.6 μm having a maximum power of 55 watt is continuously focused on probe tip, using a specialized force air-cooled fiber, despite the radial movement. The set-up is designed for direct measurement of radial profiles of plasma potential in edge plasma region of ADITYA-U tokamak. Probe is biased with respect to plasma potential and I-V is acquired with high sampling frequency. Obtained I-V is plotted and explored for the estimation of ion density, electron temperature and plasma potential. Experimental results are reported here and discussed.

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