



**Study of heating profile and emission current density of CeB₆ material used as
Laser heated emissive probe in plasmas**

Abha Kanik¹, Joydeep Ghosh², Payal Mehta², Arun Sarma¹

¹ VIT University, Chennai, INDIA, ² IPR, Institute for Plasma Research, Bhat, INDIA

Conventional emissive Langmuir probes consists of a tungsten wire heated with current passing through it. Whereas an appropriate laser is used to heat the probe tip in Laser Heated Emissive Probe (LHEP) to overcome many limitations of the conventional emissive probes [1]. In LHEP, a CO₂ laser of wavelength 10.2 micron with variable output power is generally used to heat the emissive probe tip. Generally LaB₆, Graphite and CeB₆ materials are used for as emissive probe tip material. However, very less amount of research has been undertaken to understand the complete heating mechanism of the above mentioned materials, specifically of CeB₆. CeB₆ is a better choice for the LHEP tip material because of its low work function. In this paper we present the detailed studies on heating mechanism of CeB₆ material and temperature profile of the same a proper ANSYS analysis. Also emission current densities at different temperatures are estimated theoretically.

References:

[1] Measurement of emission current and temperature profile of emissive probe materials using CO₂ LASER (DOI: 10.1016/j.cap.2011.02.024)