

Activity of Indian High Heat Flux Test Facility (HHFTF)

- Facility established in year 2013 and is in full-fledged operation since year 2016.
- Poster provides brief overview of the facility, high heat flux testing capabilities and few of the experiments performed recently.
- 200 kW high power electron beam is used as a heat source. High heat flux testing of full-scale mock-up of ~1.5m length, 1.2m height, 0.5m width and weight up to 1Ton is possible with active cooling using high-pressure and high temperature (5 - 60 bar, 25 - 160 °C) water up to 300 lpm flow rate.
- Cross section of high power electron beam is measured at various electron beam powers with proper focusing of beam by adjusting lens currents of electron gun. Different heat load patterns are generated by static point-beam or rastering beam along line segments.
- HHFTF is being mainly used for the thermal load testing of Plasma Facing Components (PFCs) & Plasma Facing Materials (PFMs) (except beryllium and other toxic plasma facing materials/components) which are expected to withstand steady state and transient heat flux of the order of several MW/m² during the normal tokamak operation. Thermal fatigue experiments performed which are helpful to examine material failure and degradation due to repetitive thermal cycling.
- High heat flux test performed on plasma facing components/materials viz. straight and curved tungsten mono-block divertor target, direct sintered processed tungsten sample, tungsten coated mock-up, tungsten coated SS mock-up, brazed tungsten mono block, tungsten coated Cu mock-up, tungsten coated RAFMS sample, prototype tungsten dome testing, onboard passive component, tungsten coated graphite sample, Faraday's Screen (WEST-CEA) and single phase flow experiments on Cu block etc. Non-uniform heat flux experiments conducted on tungsten mono-block tiles. Also, critical heat flux experiments are being performed.