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Theory Experiment

Power Accounting in DIII-D,* M.J. Martin, *Cornell U.*; J.G. Watkins, *SNL*; C.J. Murphy, T.E. Evans, *GA*; M. Jakubowski, *KFZ-Julich*; I. Joseph, *UCSD*; C.J. Lasnier, *LLNL* – The plasma facing components in a fusion reactor will be exposed to high levels of heat and particle flux. A full accounting of where the plasma energy is deposited is important for designing future fusion reactors. To understand where the power is going, we do a total power accounting in DIII-D for different conditions such as H-mode, ohmic, and ELM-free H-mode plasmas. We use measurements from IR cameras, bolometers, Langmuir probes, and thermocouples to determine the distribution and magnitude of power deposition inside the tokamak as well as the consistency of the different measurements. We compare the thermal response measurements with both a simple thermal diffusion model and a finite element thermal model of the target plate tiles. A basic parameter that relates heat and particle flux at the plasma/materials interface is the power transmission factor. By comparing the particle flux and heat flux, we can measure the sheath factor profile for each of the above conditions.

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