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12.56 Particle and Heat Flux Diagnostics on the C-2W Divertor Electrodes

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A suite of diagnostics was developed to measure particle and heat fluxes arriving at the divertor electrodes of the C-2W experiment at TAE Technologies. The divertor electrodes consist of 4 concentric rings, each equipped with a bolometer, electrostatic energy analyzer, and thermocouple mounted at two opposing azimuthal locations. These probes provide two independent measurements of the power flux to the divertor electrodes, as well as measurements of the ion current density, ion energy distribution, and total energy deposition. The thermocouples also provide calibration points for inferring the heat deposition profile via thermographic imaging of the electrodes with a fast infrared camera. The combined measurements enable the calculation of the energy lost per escaping electron/ion pair, which is an important metric for understanding electron heat transport in the open field lines that surround the field-reversed configuration (FRC) plasma in C-2W.

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