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An assessment of surface emissivity variation effects on plasma uniformity analysis using IR cameras ABIGAIL GREENHALGH, Univ. of Kentucky, MELISSA SHOWERS, Univ. of Tennessee, THEODORE BIEWER, Oak Ridge National Lab — The Prototype-Material Plasma Exposure eXperiment (Proto-MPEX) is a linear plasma device operating at Oak Ridge National Laboratory (ORNL). Its purpose is to test plasma source and heating concepts for the planned Material Plasma Exposure eXperiment (MPEX), which has the mission to test the plasma-material interactions under fusion reactor conditions. In this device material targets will be exposed to high heat fluxes (>10 MW/m2). To characterize the heat fluxes to the target a IR thermography system is used taking up to 432 frames per second videos. The data is analyzed to determine the surface temperature on the target in specific regions of interest. The IR analysis has indicated a low level of plasma uniformity; the plasma often deposits more heat to the edge of the plate than the center. An essential parameter for IR temperature calculation is the surface emissivity of the plate (stainless steel). A study has been performed to characterize the variation in the surface emissivity of the plate as its temperature changes and its surface finish is modified by plasma exposure.

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