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Status and Plans for Infrared Thermography and Heat flux Measurements on NSTX-U TRAVIS GRAY, JOON-WOOK AHN, ORNL, KAIFU GAN, UTK, ALISTAIR MCGANN, University of York, MATTHEW REINKE, ORNL, RAJESH MAINGI, PPPL, BRIAN WIRTH, UTK — Improvements and expansion of IR thermography tools on NSTX-U are being pursued to support a range of boundary physics research. Due to a carbon-lithium mixed material environment and upcoming use of high-Z materials, NSTX-U presents a challenge in determining the deposited power flux to plasma facing components (PFCs). The majority of the PFCs are graphite which has a high surface emissivity but extensive use of lithium wall conditioning creates a mixed material divertor environment. Furthermore, a row of low emissivity/highly reflective molybdenum tiles will be installed in the outboard divertor for the next run campaign. To overcome these challenges as well assess overall power balance in NSTX-U, infrared coverage of the PFCs has been increased. The lower divertor outer strike point (OSP) is observed by a 1.6 kHz IR camera equipped with dual-band optics to account for the changes in surface emissivity introduced with the addition of lithium [AG MCLean, RSI 2012]. A wide-angle view of the lower divertor and a tangential view of the HHFW antenna and limiters has been added for the commencement of plasma operations on the NSTX-U. Measurements of the lower divertor, inner strike point (ISP) as well as the upper diverter OSP will be implemented for the FY17 run campaign. The installation of the molybdenum tiles will also include calorimeters to further constrain the heat flux measurements on those tiles with plans to increase calorimeter coverage.

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