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Application of fast dual-band infrared on NSTX[1] ADAM MCLEAN, JOON-WOOK AHN, TRAVIS GRAY, RAJESH MAINGI, ORNL, MARK BENJAMIN, West Windsor-Plainsboro High School South, NATHAN GARDNER, Lawrence Technological University, BRENDAN LYONS, FILIPPO SCOTTI, Princeton, LANE ROQUEMORE, PPPL, VLAD SOUKHANOVSKII, LLNL, ORNL COLLABORATION, NATIONAL SPHERIAL TOKAMAK EXPERIMENT TEAM — The ORNL fast infrared (IR) camera on the National Spherical Tokamak Experiment (NSTX) device has been upgraded to simultaneously observe dual IR bands at its maximum frame rate, 1.6 kHz, in order to nearly eliminate dependence of the measured emission on surface emissivity. An image splitter was developed to project both IR channels – the 4-6 micron medium wavelength, and the 7-10 micron long wavelength bands – side by side on the broadband HgCdTe detector in the camera; the splitter has been upgraded to include the use of hybrid diffusive optical element (DOE) lenses in order to reduce chromatic aberration and to improve image quality and dynamic range. Using this instrument, the relationship between the emission ratio and surface temperature for a variety of camera parameters, and the impact on the resulting heat flux profile calculated from IR video are investigated.

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