

Abstract Submitted  
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**Development of a prototype infrared imaging bolometer for NSTX-U** G.G. VAN EDEN, Dutch Institute for Fundamental Energy Research/PPPL, L.F. DELGADO-APARICIO, PPPL, T.K. GRAY, ORNL, M.A. JAWORSKI, PPPL, T.W. MORGAN, Dutch Institute for Fundamental Energy Research, B.J. PETERSON, National Institute for Fusion Science (Japan), M.L. REINKE, ORNL, R. SANO, K. MUKAI, National Institute for Fusion Science (Japan), DIFFER/PPPL COLLABORATION, NIFS/PPPL COLLABORATION — Measurements of the radiated power in fusion reactors are of high importance for studying detachment and the overall power balance. A prototype Infrared Video Bolometer (IRVB) is being developed for NSTX-U complementing resistive bolometer and AXUV diode diagnostics. The IRVB has proven to be a powerful tool on LHD and JT-60U for its 2D imaging quality and reactor environment compatibility. For NSTX-U, a poloidal view of the lower center stack and lower divertor are envisaged for the 2016 run campaign. The IRVB concept images radiation from the plasma onto a  $2.5\ \mu\text{m}$  thick  $9 \times 7\ \text{cm}^2$  calibrated Pt foil and monitors its temperature evolution using an IR camera (SB focal plane, 2-12  $\mu\text{m}$ , 128x128 pixels, 1.6 kHz). The power incident on the foil is calculated by solving the 2D+time heat diffusion equation. Benchmark characterization is presented, demonstrating a sensitivity of approximately 20 mK and a noise equivalent power density of  $71.5\ \mu\text{W cm}^{-2}$  for 4x20 bolometer super-pixels and a 50 Hz time response. The hardware design, optimization of camera and detector settings as well as first results of both synthetic and experimental origin are discussed.

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