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2.21 Signal to noise ratio of upgraded imaging bolometer for KSTAR

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An InfraRed imaging Video Bolometer (IRVB) [1,2] that was previously used on the JT-60U device [3] was installed on KSTAR in 2012. The IRVB had a 2 micron x 7 cm x 9 cm Pt foil blackened with graphite and a 5 mm x 5 mm aperture located 7.5 cm from the foil and had 16 x 12 channels and a time resolution of 10 ms. In 2017 the IRVB was upgraded by replacing the IR camera with a FLIR SC7600 (InSb, 640 x 512 pixels, 105 fps, 25 mK). The aperture area was reduced by approximately half to 3.5 mm x 3.5 mm and the number of channels was quadrupled to 32 x 24. Assuming a uniformly radiating plasma of 15 m3 and 1 MW of radiated power and a viewing path length through the plasma of 3 m, the signal level on the foil was estimated to be 55 W/m2 in the previous case and 27 W/m2 with the upgrade. The resulting NEPDs (signal to noise ratios (SNR)) were 1.28 W/m2 (43) in the previous case and 2.35 W/m2 (12) with the upgrade. In the conference presentation synthetic images from SOLPS modelling will be compared with experimental images from the upgraded IRVB to give better estimates of the SNR. [1] B.J. Peterson, Rev. Sci. Instrum. 71(10) (2000) 3696. [2] B.J. Peterson et al., Rev. Sci. Instrum. 74(3) (2003) 2040. [3] B.J. Peterson et al., Rev. Sci. Instrum. 79 (2008) 10E301.

Primary author(s) : PETERSON, Byron Jay (National Institute for Fusion Science)

Co-author(s) : OH, Seungtae (National Fusion Research Institute); SEO, Dongcheol (National Fusion Research Institute); JANG, Juhyeok (Korea Advanced Institute of Science and Technology); MUKAI, Kiyofumi (National Institute for Fusion Science); PARK, Jae Sun (Korea Advanced Institute of Science and Technology); CHOE, Wonho (Korea Advanced Institute of Science and Technology)

Presenter(s) : PETERSON, Byron Jay (National Institute for Fusion Science); OH, Seungtae (National Fusion Research Institute); SEO, Dongcheol (National Fusion Research Institute); JANG, Juhyeok (Korea Advanced Institute of Science and Technology); MUKAI, Kiyofumi (National Institute for Fusion Science); PARK, Jae Sun (Korea Advanced Institute of Science and Technology); CHOE, Wonho (Korea Advanced Institute of Science and Technology)

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