

新しい IRVB 金属箔キャリブレーション手法の LHD プラズマ実験計測への適用  
**Application of a new calibration method for IRVBs in LHD**

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Power balance between incident power and power loss is should be understood to control a fusion plasma with steady state. Radiation loss is one of the major channels of the power loss. Measurement of radiation is necessary to understand power balance on the fusion plasma. IR imaging video bolometer (IRVB)[1] is a powerful measurement instrument for plasma radiation. IRVBs have been installed in JT-60U, KSTAR and LHD and used to measure the radiation. The IRVB is based on pin-hole projection principle and provides radiation distribution and intensity from the plasma. In IRVB observation, plasma radiation is absorbed by the IRVB foil and makes a 2D temperature distribution on the foil. The absorbed radiation is calculated by solving the heat diffusion equation on the foil. The IRVB foil has variance in foil parameters such as thickness of the foil. Because the foil parameter is used in the heat diffusion equation, the variance of the foil parameter should be evaluated for the calibration between the 2D temperature distribution and the absorbed radiation before measurement. In a recent study, a new calibration method which can evaluate the distribution of effective foil thickness and emissivity on the foil had been developed [2]. In this study, the new calibration method has been applied to the foil of the installed IRVB in LHD. The foil had been used to measure the radiation in the 2012 experimental campaign. The measured radiation profile which is applied the calibration data has structures similar to those simulated radiation profiles using EMC-3 EIRINE[3] in Figure 1. The new calibration method can be considered an effective calibration method. this new calibration method will be applied to foils for other IRVBs and used to measure the radiation.

- [1] B. J. PETERSON, et al., Rev.Sci.Instrum.**74**(3) (2003)2040  
 [2] Ryuichi SANO et al., Plasma and Fusion Res. **7** 2405039 (2012)  
 [3] M.Kobayashi et al. Phys Plasmas **17**, 056111(2010)

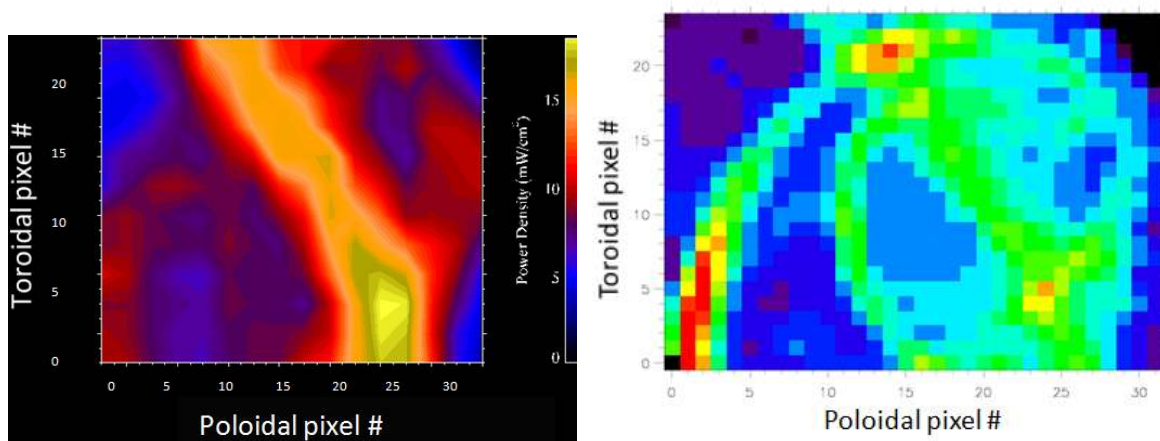


Figure 1 Incident radiation distribution at the IRVB foil in experiment (left) during discharge measured by an IRVB installed at the 6-T port in LHD. Simulated distribution of incident radiation at the 6-T IRVB (right).