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Absolute intensity calibration of two-channel prototype ITER vacuum ultraviolet spectrometer with a collimating mirror. CHANGRAE SEON, NFRI, Gwahangno 169-148, Yuseong-gu, Daejeon, Korea, JOOHWAN HONG, KAIST, Gwahangno 335, Yuseong-gu, Daejeon, Korea, MUNSEONG CHEON, SUNIL PAK, HYEONGON LEE, NFRI, Gwahangno 169-148, Yuseong-gu, Daejeon, Korea, WOLFGANG BIEL, Institut für Plasmaphysik, Forschungszentrum Jülich GmbH, EURATOM Association, Jülich, Germany, ROBIN BARNSELEY, ITER Organization, Cadarache Centre, 13108 Saint-Paul-Lez-Durance, France — To optimize the design of ITER vacuum ultraviolet (VUV) spectrometer, a two-channel prototype spectrometer was implemented with No. 3 (14.4 nm – 31.8 nm) and No. 4 (29.0 nm – 60.0 nm) among the five channels. The prototype is composed of a toroidal mirror, and two toroidal diffraction gratings and two different detectors of the back-illuminated CCD and the micro-channel plate (MCP). To verify each optical component, the absolute intensity calibration was performed using the calibrated hollow cathode lamp. Inverse sensitivities of each spectrometer were derived by dividing the incident photon numbers with the measured detector counts. The measured sensitivity values were consistent with the sensitivities calculated from the grating and the detector efficiencies. Consequently the calibration curves of the two-channel VUV spectrometer were provided, and the mirror reflectivity and the detector efficiency could be confirmed experimentally. For the application of the calibrated spectrometer, measurements of impurity lines in KSTAR plasmas were performed, and the line integrated emissivity was derived from the calibration curve during impurity injection experiments.

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