**Design of reflectivity measurement device of First Mirrors in ITER VUV spectrometers**

Yoo Kwan Kim1,2, Boseong Kim2, Younghwa An2, Changrae Seon2, Jungmin Jo2, Munseong Cheon2, and Yu Kwon Kim1\*

*1Department of Energy Systems Research, Ajou University, 206 Worldcup-ro, Suwon 16499, Korea*

*2Korea Institute of Fusion Energy, 169-148 Gwahak-ro, Daejeon 34133, Korea*

First Mirror is an optical component that plays an essential role in that it deflects the light emitted from the plasma to the diagnostic system in fusion plasmas. In the ITER VUV spectrometer. the measurement of reflectivity is also required for the mirrors in VUV wavelength range. The ITER VUV spectrometer covers the wavelength range of 2.4 – 120 nm, and we intend to make an experimental device to measure the reflectivity of VUV mirrors (especially Silicon Carbide mirror) in the designated wavelength of VUV light. Reflectivity measurements, firstly, need to be performed for two different types of Elliptic cylindrical shaped mirrors (edge imaging, dirvertor VUV) at different reflected areas (ends and center of the mirror). A high current hollow cathode lamp and a 642-1 multi-anode UHV SXR source were used for the light source in the VUV wavelength range. 642-1 multi-anode UHV SXR source is a light source that can emit light in the range of 1 - 20 nm and the high current hollow cathode is a light source that can emit light in the region of 23 - 160 nm with He and Ne plasma. Since the VUV spectrometer requires the vacuum system, the experimental device is consisted of three different vacuum chambers, which are slit chamber, grating chamber and mirror chamber, respectively. The grating chamber consists of Laminar-type Replica Diffraction Gratings for VUV / Soft X-ray Region (Shimadzu) and x-y-z translation, rotation and tilt stages for manipulating the grating location. The mirror chamber consisted of mirror which is equipped with holder and motorized linear stage. Two light beam ports are separated for CCD detectors, one for reference light and the other for measuring the reflected light. The reflection angle of the light is varied depending on the wavelength and the location of the projected area of the mirrors. This experimental set-up allows scanning the full range of the VUV mirror surfaces to evaluate the uniformity of the mirror surface as well as measuring the reflectivity at different wavelengths and projected area of mirror in the VUV wavelength range.