Contribution ID: **500** Type: **Poster**

# Effect of wall light reflection in ITER diagnostics

*Wednesday, 19 October 2016 14:00 (4h 45m)*

Reflection of light on walls will form parasitic signal on various diagnostics and be a serious issue in ITER. In this study, we show the recent progress in the assessment of the effects of the wall reflections in ITER on visible spectroscopy, Thomson scattering, active spectroscopy, and infrared thermography based on the ray tracing simulation modeling. In this study, it is shown that the stray light becomes orders of magnitudes greater than the actual signal when the actual signal is significantly lower than the strong emission sources. The line emission will be much stronger from the divertor region than from the scrape-off layer (SOL) in ITER. The emission from the divertor region is so strong that the stray light dominates the illuminance profile for SOL region when considering the wall reflections. It is shown that the stray light becomes significant even for visible spectroscopy measurement in divertor region if there are regions where original illuminance is much lower than the other parts. It is necessary to reduce the stray light level by using viewing dumps etc. To estimate the error more accurately, the principles of synthetic diagnostics (SD) for ITER Main Chamber H-alpha Spectroscopy are formulated, and the developed algorithms are applied to evaluation of recovering the useful signal under a strong background from divertor stray light (DSL) in ITER.
In order to anticipate the IR measurements in such a metallic environment, a photonic simulation was performed using a Monte Carlo ray tracing based on SPEOS® CAA V5. The first step was done with the simulation of the wide-angle IR thermography system of the JET ITER-like wall, proving good agreement with the experimental data.
For the Thomson scattering diagnostic, to assess the background light reflection (bremsstrahlung and line emission), the emissivity profiles were obtained from the results of SOLPS4.3 modeling for the carbon-free ITER divertor with Ne seeding. The simulation indicates that the level of the reflected background from the divertor plasma, i.e., the bremsstrahlung and line emission, can be much greater than that from the core plasma. It was found that some lines were above the level of the bremsstrahlung, and should be rejected by the spectrometer filter for Thomson scattering systems in ITER.

## Paper Number

FIP/P4-14

## Country or International Organization

Japan

**Primary author:** Dr KAJITA, Shin (Nagoya University)

**Co-authors:** Dr KUKUSHKIN, Alexander B. (NRC Kurchatov Institute); Dr ALEKSEEV, Andrey (NRNU MEPhI); Dr YATSUKA, Eiichi (JAEA); Dr ANDREENKO, Evgeny (NRC Kurchatov); Dr VESHCHEV, Evgeny (ITER Organization); Dr ANDREI, Kukushkin (NRC Kurchatov Institute); Dr DE BOCK, Maarten (ITER Organization); Dr AUMEUNIER, Marie-Helene (CEA); Dr WALSH, Michael (ITER Organization); Dr BASSAN, Michele (ITER Orga-

nization); Dr BARNSLEY, Robin (ITER Organization); Dr REICHLE, Roger (ITER Organization); Dr NEVEROV, Vladislav (NRNU MEPhI)

**Presenter:** Dr KAJITA, Shin (Nagoya University)

**Session Classification:** Poster 4

**Track Classification:** FIP - Fusion Engineering, Integration and Power Plant Design