

ITERポロイダル偏光計測装置の開発の進展

Progress of development of ITER Poloidal Polarimeter

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The ITER Poloidal Polarimeter (PoPola), which is developed by Japan, has a primary role to measure the current profile (q profile) for the physics understanding of ITER plasma [1, 2]. Additionally, real-time output signals from PoPola will be used for detection of locations of rational q surfaces ($q = 1.5, 2$) for suppression of the neo-classical tearing mode and q_{\min} for the reversed magnetic shear control. In order to fulfill above roles, far-infrared laser polarimetry is employed with the laser wavelength of about $120\ \mu\text{m}$ to measure changes in polarimetric properties of the laser light by the plasma due to Faraday and Cotton-Mouton effects [3]. Figure 1 shows the conceptual layout of components of PoPola in the ITER tokamak building. A number of measurement chords is fifteen at the maximum, where six chords at an upper port plug and nine chords at an equatorial port plug are allocated, respectively.

After the completion of the conceptual design and concluding of the procurement arrangement between JAEA and ITER Organization, JAEA has started the detailed design of PoPola in 2013. During the detailed design phase for about three years, all components of PoPola will be designed precisely and the entire system performance will be evaluated. In parallel, prototyping is planned to encompass key elements and area, e.g. plasma facing equipment (in-vessel retroreflectors on blanket modules, plasma facing mirrors in Port Plugs), automatic laser beam alignment, calibration, detection optics, etc.

The recent status and planning for the detailed design and prototyping will be presented at the meeting.

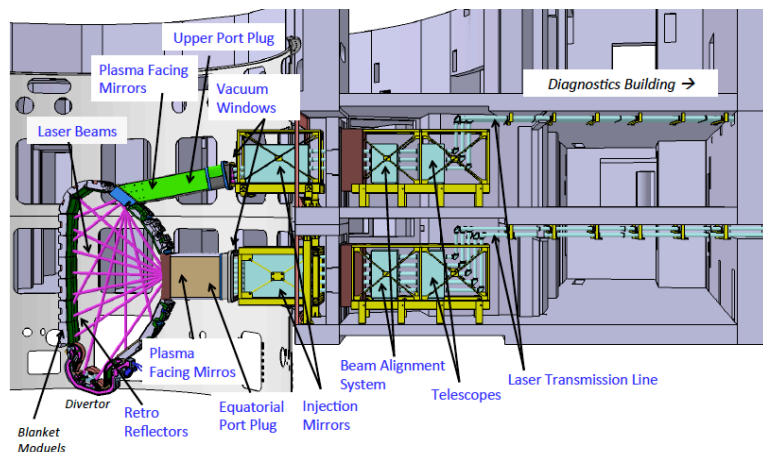


Fig.1 Conceptual layout of components of PoPola in the ITER Tokamak Building

References

- [1] Y. Kawano *et al.*, Proc. 24th IAEA Fusion Energy Conference 2012, ITR/P5-38
- [2] R. Imazawa *et al.*, Nuclear Fusion **51** (2011) 113022
- [3] R. Imazawa *et al.*, Proc. 30th Annual Meeting of JSPF 2013, 05aB02

The views and opinions expressed herein do not necessarily reflect those of the ITER Organization.