



Contribution ID: 348

Type: **Poster**

ITR/P5-34: Mirrors for ITER Optical Diagnostics

Thursday, 11 October 2012 08:30 (4 hours)

The large distance between ITER vacuum windows and the plasma boundary necessitates the use of in-vessel optical diagnostic components. High particle fluxes, temperature and radiation level expected inside ITER imposes considerable limitations on mirrors design. The choice of FM (First Mirrors) structure and material depends on the mirror location and on the diagnostic needs.

The presentation covers the most general approaches to the FM problem in ITER and demonstrates the implantation of basic concepts in the design of FM in the divertor Thomson scattering system. The FM design options and their advantages and disadvantages in different operation conditions expected in ITER are discussed along with new results on the development of optics cleaning and deposition-mitigating techniques. The focus is on the efficiency of plasma cleaning combined with blowing out contaminations. The impact of plasma treatment on the mirror surface is also discussed. The parameters of cleaning capacitively-coupled discharge in working ITER gas –deuterium were calculated within the hydrodynamic model and experimentally verified. The blowing-out efficiency has been estimated for the prototype of the divertor laser launcher duct. The implementation of other protection and cleaning techniques, like laser cleaning, heating and shutters is considered.

Country or International Organization of Primary Author

Russian Federation

Collaboration (if applicable, e.g., International Tokamak Physics Activities)

ITER Activities, International Tokamak Physics Activities

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Session Classification: Poster: P5

Track Classification: ITR - ITER Activities