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ITR/P5-34: Mirrors for ITER Optical Diagnostics

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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)

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Primary author: Mr RAZDOBARIN, Alexey (Ioffe Physical-Technical Institute of the Russian Academy of Sciences)

Co-authors: Prof. SMIRNOV, Aleksander (Saint-Petersburg State Polytechnic University); Prof. GORODETSKY, Alexander (Frumkin Institute of Physical Chemistry and Electrochemistry); Prof. ZAKHAROV, Alexander (Frumkin Institute of Physical Chemistry and Electrochemistry, Moscow); Mr BEREZUTSKY, Alexey (Ioffe Physico Technical Institute); Dr SITNIKOVA, Alla (Ioffe Physico Technical Institute); Dr ALEKSEEV, Andrei (National Research Centre “Kurchatov Institute”); Mr KIRILENKO, Daniil (Ioffe Physico Technical Institute); Dr MUKHIN, Eugene (Ioffe Physical Technical institute); Mr KHILKEVITCH, Evgeniy (Saint-Petersburg State Polytechnic University); Mr KURSKIEV, Gleb (Ioffe Physico Technical Institute); Dr ARKHIPOV, Igor (Frumkin Institute of Physical Chemistry and Electrochemistry); Dr ORLOVSKIY, Iliia (National Research Centre “Kurchatov Institute”); Mr RYZHKOV, Ivan (National Science Centre, Kharkov Institute of Physics and Technology); Prof. VUKOLOV, Konstantin (National Research Centre “Kurchatov Institute”); Dr KOCHERGIN, Mikhail (Ioffe Physico Technical Institute); Mrs SKORIK, Olga (National Science Centre, Kharkov Institute of Physics and Technology); Mr CHERNAKOV, Pavel (Ioffe Physical Technical Institute); Dr ANDREW, Phillip (ITER Organization); Dr ZALAVUTDI-

NOV, Rinad (Frumkin Institute of Physical Chemistry and Electrochemistry); Mr MASYUKEVICH, Sergei (Ioffe Physico Technical Institute); Dr TOLSTYAKOV, Sergei (Ioffe Physico Technical Institute); Dr CHERNOIZIUMSKAYA, Tatjana (Saint-Petersburg State Polytechnic University); Dr BUKHOVETS, Valentin (Frumkin Institute of Physical Chemistry and Electrochemistry); Dr KONOVALOV, Vladimir (National Science Centre, Kharkov Institute of Physics and Technology); Dr SEMENOV, Vladimir (Ioffe Physical Technical Institute); Prof. VOITSENYA, Vladimir (National Science Centre, Kharkov Institute of Physics and Technology); Dr BONDARENKO, Vladislav (National Science Centre, Kharkov Institute of Physics and Technology)

Presenter: Mr RAZDOBARIN, Alexey (Ioffe Physical-Technical Institute of the Russian Academy of Sciences)

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