



IAEA FEC 2014

Contribution ID: 349

Type: Overview Poster

Review of Globus-M Spherical Tokamak Results

Monday 13 October 2014 14:00 (4h 45m)

First experiments on noninductive current drive (CD) using lower hybrid waves at 2.45 GHz are described. Waves were launched by a 10 waveguide grill with 120° phase shift between neighboring waveguides. The experimental conditions for a poloidal slowing-down scheme are described. The CD efficiency is found to be somewhat less than for standard tokamak lower hybrid CD. Geodesic acoustic modes (GAM) have been discovered in Globus-M with the help of two Doppler reflectometers. GAMs are localized 2-3 cm inside the separatrix. The GAM frequency agrees with theory whereas the density oscillations is found to have mainly an $n=0$, $m=0$ spatial structure. Fast particle confinement during neutral beam injection has been studied and numerically simulated. Alfvén instabilities excited by fast particles were detected by a toroidal Mirnov probe array. Their excitation conditions are discussed and the dynamics of fast ion losses induced by Alfvén eigenmodes is presented. Unlike for conventional tokamaks, no isotopic effect on confinement has been observed in ohmic discharges comparing similar D and H plasmas. Plasma transport was modelled self consistently from the magnetic axis to the material wall. SOL parameters are compared with experimental results. For plasma-wall interaction studies a specific divertor target consisting of an a-priori damaged tungsten tiles was prepared. The damage was induced by an electron beam or by a plasma gun jet. The damage factor was equivalent to the damage produced by 100 -1000 ELM events in ITER. The first results show a strongly nonuniform temperature field formation on the damaged targets after plasma disruptions. A preliminary explanation is that the initial damage gives rise to a layer with low thermal conductivity right under the surface. We will finish explaining specific engineering design issues of the next step - Globus-M2 (1 T, 500 MA) and describe the status of component manufacture.

Country or International Organisation

Russian Federation

Paper Number

OV/P-03

Primary author: Mr GUSEV, Vasily (Russian Federation)

Co-authors: Dr GORODETSKIY, Alexander (A.N. Frumkin Institute of Physical Chemistry and Electrochemistry); Mr PETROV, Alexander (Saint Petersburg State Polytechnical University); Dr SAVELIEV, Alexander (Ioffe Physical-Technical Institute of Russian Academy of Science); Dr VORONIN, Alexander (Ioffe Physical-Technical Institute of Russian Academy of Science); Mr YASHIN, Alexander (Saint Petersburg State Polytechnical University); Mr NOVOKHATSKY, Alexandr (Ioffe Physical-Technical Institute of the Russian Academy of Sciences); Mr BYKOV, Alexey (Saint Petersburg State Polytechnical University); Dr LABUSOV, Alexey (D.V. Efremov Institutes of Electrophysical Apparatus); Mrs IBLYAMINOVA, Alsu (Ioffe Physical-Technical Institute of Russian Academy of Science); Mr MELNIK, Andrei (Ioffe Physical-Technical Institute of Russian Academy of Science); Dr ZAKHAROV,

Andrei (A.N. Frumkin Institute of Physical Chemistry and Electrochemistry); Dr BER, Boris (Ioffe Physical-Technical Institute of Russian Academy of Science); Dr BONDARCHUK, Eduard (D.V. Efremov Institutes of Electrophysical Apparatus); Dr DEMINA, Elena (A.A. Baikov Institute of Metallurgy and Materials Science); Ms VEKSHINA, Elena (Saint Petersburg State Polytechnical University); Dr KAVEEVA, Elizaveta (Saint Petersburg State Polytechnical University); Dr MUKHIN, Eugene (Ioffe Physical-Technical Institute of Russian Academy of Science); Prof. GUSAKOV, Evgeniy (Ioffe Physical-Technical Institute of Russian Academy of Science); Mr ZHILIN, Evgeniy (Ioffe Fusion Technologies Ltd); Dr CHERNYSHEV, Fedor (Ioffe Physical-Technical Institute of Russian Academy of Science); Dr WAGNER, Fritz (Max-Planck Institute for Plasma Physics); Mr ZADVITSKIY, Georgii (Saint Petersburg State Polytechnical University); Dr MAZUL, Igor (D.V. Efremov Institutes of Electrophysical Apparatus); Mr MIROSHNIKOV, Igor (Saint Petersburg State Polytechnical University); Dr SENICHENKOV, Ilya (Saint Petersburg State Polytechnical University); Dr PATROV, Michael (Ioffe Physical-Technical Institute of Russian Academy of Science); Dr IRZAK, Michail (Ioffe Physical-Technical Institute of Russian Academy of Science); Mr KHOKHLOV, Mikhail (D.V. Efremov Institutes of Electrophysical Apparatus); Mr LITUNOVSKY, Nikolai (D.V. Efremov Institutes of Electrophysical Apparatus); Mr BAKHAREV, Nikolay (Ioffe Physical-Technical Institute of Russian Academy of Science); Dr KHROMOV, Nikolay (Ioffe Physical-Technical Institute of Russian Academy of Science); Dr SAKHAROV, Nikolay (Ioffe Physical-Technical Institute of Russian Academy of Science); Dr SHCHERBININ, Oleg (Ioffe Physical-Technical Institute of Russian Academy of Science); Dr GONCHAROV, Pavel (Saint Petersburg State Polytechnical University); Mr SHCHEGOLEV, Peter (Ioffe Physical-Technical Institute of Russian Academy of Science); Dr ZALAVUTDINOV, Rinad (A.N. Frumkin Institute of Physical Chemistry and Electrochemistry); Mr KRASNOV, Sergei (D.V. Efremov Institutes of Electrophysical Apparatus); Dr TOLSTYAKOV, Sergei (Ioffe Physical-Technical Institute of Russian Academy of Science); Mr VOSKOBOINIKOV, Sergei (Saint Petersburg State Polytechnical University); Mr KHITROV, Sergey (Ioffe Physical-Technical Institute of Russian Academy of Science); Mr LEPIKHOV, Sergey (Ioffe Physical-Technical Institute of Russian Academy of Science); Dr DYACHENKO, Valerij (Ioffe Physical-Technical Institute of Russian Academy of Science); Dr BULANIN, Victor (Saint Petersburg State Polytechnical University); Dr TANCHUK, Victor (D.V. Efremov Institutes of Electrophysical Apparatus); Dr MINAEV, Vladimir (Ioffe Physical-Technical Institute of Russian Academy of Science); Prof. ROZHANSKY, Vladimir (St.Petersburg State Polytechnical University); Prof. SERGEEV, Vladimir (Saint-Petersburg State Polytechnical University); Dr VARFOLOMEEV, Vladimir (Ioffe Physical-Technical Institute of Russian Academy of Science); Mr MIKOV, Vyacheslav (Joint-Stock Company "INTEHMASH"); Dr PETROV, Yuriy (Ioffe Physical-Technical Institute of Russian Academy of Science)

Presenter: Mr GUSEV, Vasily (Russian Federation)

Session Classification: Overview Posters

Track Classification: OV - Overviews