OV/5-4

TOKAMAK RESEARCH IN IOFFE INSTITUTE

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GLOBUS-M

Energy confinement: $\tau_E^{GLB} \sim I_p^{0.77} B_T^{1.3} P_{abs}^{-0.8} n_e^{0.67}$. Energy confinement time depends strong on toroidal magnetic field Normalized energy confinement time exhibits moderate dependence on collisionality Ion heat transport is close to neoclassical level. Anomalous contribution is observed at low collisionality.

TAE: TAE-induced losses of fast particles strongly depend on Ip and weaker on B_T (experiments). For the first time in the world experimental localization was acquired using DBS method. Strong bursting modes with n=1, m=2,3 are localized on the periphery in the region of normalized minor radii ρ from 0.6 to the separatrix. Modeling supports the experimental results.

Disruptions: A favorable, almost linear dependence of the normalized current quench time on the plasma current density before the disruption was observed. The disruption characteristics depended weakly on the ion mass (H or D). Experimentally measured local pressure on the lower dome of the vacuum chamber = 17 kPa at Ip = 200 kA.

SOL: experimental values of λ_q are close to Eich-2013 scaling.

TUMAN-3M

ICE: Ion Cyclotron Emission was observed in both PH and NBI heated scenarios. In OH plasma, in the absence of fast ions, ICE was found to originate from plasma periphery and has up to 9 harmonics. In NBI-heated plasma, ICE frequency corresponds to the ICR for minority ions in the vicinity of the magnetic axis, and is produced, most probably, by CAE instability excited by fast ions residing at the stagnation orbits

Alfven waves: observed in the OH plasma. located in core region r/a<0.5 and are, most probably, of GAE type. Among possible mechanisms of AW excitation in the absence of fast ions are magnetic field perturbation caused by sawtooth crashes and runaway electrons; the specific physics is unclear.

L-H transition: Both modeling results and theory of LH-transition possibility show that strong inhomogeneous E_r is crucial, however not enough for LH-transition initiation; particle source plays an important role in the defining of the self-sustaining H-mode possibility.

FT-2

The benchmarking against X-mode DR experimental data, has demonstrated a good agreement between the DR spectra measured and computed using synthetic diagnostic. For all antennae positions used for comparison both the spectra frequency shift and width and in many cases the spectra shape were similar, demonstrating a correct reproduction of the electric field behavior. The only pronounced difference between the measurements and synthetic diagnostics is found in dependence of the DR signal power on the antenna vertical displacement due to the underestimation of the small-scale turbulence level in its decay region at the high field side of the torus.

THEORY GROUP

The anomalous absorption of the pump wave in the ECRH experiments due to the parametric excitation of trapped UH waves in the vicinity of the density or magnetic field profile local maximum is considered. The general consideration is accompanied by the numerical analysis performed for the experimental conditions typical of the X2 or O1-mode ECRH experiments at TEXTOR.

ITER

NPA, GRS and DTS/LIF diagnostics development goes according to plans.

GLOBUS-M2

First plasma in Globus-M2 was produced on April 23, 2018. During the first campaign B_T= 0.6 T was achieved.