

# STUDIES OF THE RADIAL ELECTRIC FIELD IN DIFFERENT OPERATIONAL MODES OF THE TUMAN-3M TOKAMAK

Askinazi L.G., Kornev V.A., Krikunov S.V., L.I.Krupnik\*  
Lebedev S.V., Smirnov A.I., Tukachinsky A.S., Vildjunas M.I., Zhubr N.A.

*Ioffe Institute, 194021, St.Petersburg, Russia; \*NSC KIPT, Kharkov, Ukraine*

e-mail: [krupnik@ipp.kharkov.ua](mailto:krupnik@ipp.kharkov.ua)

This paper presents results of plasma potential profile and temporal evolution study performed in different operational modes of the TUMAN-3M tokamak: ohmic L and H-modes, NBI heated plasmas, discharges with strong MHD activity. Central plasma potential evolution was measured using the HIBP, whereas at the plasma edge the Langmuire probes were used for the measurement of radial electric field structure. A pronounced negative perturbation of the central plasma potential was observed during the H-mode transition caused by NBI heating pulse. In the presence of strong burst of low frequency, low m,n MHD activity both central plasma potential and peripheral plasma electric field was found to become positive. In the H-mode, this positive perturbation of the radial electric field destroyed "natural" negative H-mode radial electric field and caused backward transition clearly seen as a deterioration of confinement. Most probable candidate for the cause of the positive perturbation of the  $E_r$  seems to be a loss of fast electrons along partly destroyed magnetic field lines. The measurement of HXR radiation from the limiter supports this idea.

Another phenomenon observed with the help of HIBP is a strong quasicohherent plasma potential oscillation with frequency  $\sim 30\text{kHz}$  and with  $\delta\phi/\phi \gg \delta n/n$ , revealing some characteristic features of GAMs. Spatial structure and temporal evolution of this GAM-like oscillation are discussed.