two-fluid simulations of peeling-balloOning MODES IN globus-m2 TOKAMAK [[1]](#footnote-1)\*)

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The synthetic Doppler backscattering diagnostic [1] is undergoing production at Globus-M2 tokamak [2]. Analysis of the filament structures created by destabilized peeling-ballooning mode (PBM) during high-performance mode operations is one of the goals of the mentioned synthetic diagnostic. Previous investigations showed that simulations of PBM utilizing single-fluid MHD simulations are capable to estimate the 2D perturbance of the kinetic pressure, but the disentanglement of the electron density and temperature perturbation was impossible [3].

In this paper, we present results of the two-fluid simulations of PBM in Globus-M2 plasmas with bottom X-point divertor configurations. The 3D MHD code implemented in BOUT++ framework [4] was used. The main advantage of two-fluid equations is the explicit inclusion of the 3D electron density perturbations, without the static temperature profile assumption. The poloidal cross-section of the density perturbation will be used as input data for synthetic diagnostic.

The initial conditions for simulations are corresponding to experimental values of plasma current, Ip, below 500 kA and toroidal magnetic field, Bt, below 1 T. The major and minor radii of Globus-M2 vacuum vessel are *R=0.36 m* and *r=0.24 m*, correspondingly. The electron density and temperature profiles were measured by the Thomson scattering diagnostic (TS) [5,6]. The stability analysis of the PBM was performed for ohmically and externally heated plasmas using TS data.

Preliminary results of Globus-M2 edge plasmas simulations using the assumption of linear two-fluid MHD equations exhibit more stable PBM at the outer midplane region than in the assumption of linear one-fluid MHD equations.

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