THE STUDY OF PLASMA FLUCTUATIONS IN THE PRESENCE OF A VELOCITY SHEAR BY THE METHOD OF RADIAL CORRELATION DOPPLER REFLECTOMETRY[[1]](#footnote-1)\*)

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1Ponomarenko A.M., 1,2Yashin A.Yu., 2Kurskiev G.S., 2Minaev V.B., 1Petrov A.V., 2Petrov Yu.V., 2Sakharov N.V., 2Shchegolev P.B., 2Zhiltsov N.S.

1Peter the Great St. Petersburg Polytechnic University, St. Petersburg, Russia  
2Ioffe Institute, St. Petersburg, Russia

On the spherical tokamak Globus-M2, where experiments were conducted with a toroidal magnetic field of up to 0.9 T and a plasma current of up to 0.43 MA, the properties of the plasma in improved confinement or in the H-mode were studied [1]. The behavior of plasma fluctuations has been investigated during the LH transition using the Doppler backscattering (DBS) method [2]. This diagnostic allowed to measure the velocity shear, as well as to observe the turbulence behavior of the plasma. It was found that the velocity shear at the separatrix increased from 3·105 s-1 in L-mode to 6·105 s-1 in H-mode. Also, at the same time as the growth of the shear, there was a sharp decrease in the amplitude of plasma fluctuations at the plasma periphery. This suggests that the LH transition phenomenon is related to the fact that the velocity shear plays a significant role in suppressing turbulence or anomalous transport, which directly contributes to stable H-mode.

In further experiments, there was a goal to study plasma turbulence in the tokamak Globus-M2 during the LH transition using the method of radial correlation Doppler reflectometry to investigate their correlation properties. For the successful implementation of this method, several multi-frequency DBS systems with fixed frequencies of 50 - 75 GHz, 20 - 48 GHz [3-4] and a single channel system with a changeable frequency of 18 - 26 GHz were installed. All of the above frequencies correspond to the detection area with a normalized small radius of , which suggests that data can be collected from different plasma regions: the core, the pedestal, the separatrix and the scrape-off layer.

In this paper the results of analysis of data on turbulence in L- and H-mode are given. For this purpose, correlation functions between the signals of different channels of DBS diagnostics (velocity and amplitude) have been calculated, with the aim of obtaining correlation lengths of the plasma fluctuations in different areas of the tokamak plasma. The influence of the various plasma parameters and injected fast particles that were used to initiate the LH transition on the values and behavior of the velocity shear was investigated. In addition, a decrease in the radial correlation length after the transition to the H-mode was found, which corresponds to the model of turbulence suppression by the velocity shear.

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1. \*) [abstracts of this report in Russian](http://www.fpl.gpi.ru/Zvenigorod/L/Mu/ru/BM-Ponomarenko.docx) [↑](#footnote-ref-1)