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ISOTOPIC EFFECT IN THE HOT ION MODE AT THE GLOBUS-M2 TOKAMAK *)

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The report is devoted to an experimental study of the heating of the plasma of the spherical tokamak Globus-M2 at a high toroidal magnetic field by the method of neutral injection. Injection of a deuterium beam into deuterium plasma makes it possible to obtain significantly higher ion temperature values than when deuterium plasma is heated by a hydrogen beam, and in both cases the ion temperature is significantly higher than the electron temperature, and the plasma is in the so-called hot ion mode [1,2]. Similar phenomena have been observed in experiments on the ST40 tokamak [3]. The confinement time of plasma energy when heated by a deuterium beam is twice as high as when injected with hydrogen, due to the higher thermal insulation efficiency of the ionic component of the plasma, while the heat transfer through the electron channel is at the same level. When injecting a hydrogen beam, the heating of ions is much less efficient, due to higher heat loss through the ion channel. In this case, the estimate of the average ionic temperature diffusivity in the experiment is significantly 3÷4 times higher than the "neoclassical" value. In deuterium injection, the ionic thermal conductivity is close to that of neoclassical. In the analyzed discharges, different rates of toroidal rotation of the plasma are observed. According to the diagnostics of active recharge spectroscopy, during the injection of a hydrogen beam. In the center of the plasma, it reaches values of 120 km/s, and during the injection of deuterium, it reaches 170 km/s. In a discharge with deuterium injection, the electron channel is the main channel of heat loss, which completely determines the retention time of plasma energy. The experiments were carried out at the Globus-M Spherical Tokamak, which is part of the Federal Center for Materials Science and Diagnostics in Advanced Technologies.

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