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Counter-NBI experiments on Globus-M

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For the first time a high energy counter-NBI was applied in the Globus-M spherical tokamak. The ELM-free H-mode was obtained. However no significant increase in the ion temperature and plasma energy content as compared to ELMy H-mode was observed. This is due to a high level of the fast ion losses (up to 97%), confirmed by modeling with NUBEAM and full 3D fast ion tracking algorithm. Increase in the plasma current from 120 to 200 kA as well as an increase in plasma-wall distance from 3 to 6 cm did not result in the increase of NB heating efficiency as it occurred during the co-NBI experiments. Modeling showed that in Globus-M2 counter-NBI experiments the power absorbed by plasma will be increased by more than an order of magnitude compared to the current experimental conditions.

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