

RF Plasma Production in Uragan-2M Torsatron

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The medium-size Uragan-2M torsatron has started operation at the end of year 2006 at Kharkov Institute of Physics and Technology. At the moment this torsatron is equipped with the radio frequency (RF) heating and does not have an electron cyclotron heating. Plasma production at Uragan-2M as well as at the previous stellarator type devices in Kharkiv is performed by the RF fields.

A single frame antenna or double frame one is used for plasma production below the cyclotron frequency. Their sizes and the regime of plasma production are chosen using the numerical modeling. In the numerical analysis, time-harmonic Maxwell's equations are solved and the power deposition to the electrons is calculated. In the calculations the plasma density is varied in the range $n_p \sim 10^8 - 10^{13} \text{ cm}^{-3}$. The single frame antenna provides the core power deposition at the low densities. With increase of the plasma density the power deposition per particle decreases and the power deposition profile worsens since more power is delivered to the plasma periphery. The maximum plasma density that could be produced is estimated for each frequency for given antenna current.

The first experimental results on plasma production in the Uragan-2M torsatron are presented and discussed.