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TOKAMAK DEVICE TM-1-MH

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A small type of tokamak device TM-1-MH with following main parameters - - major radius 40 cm, liner radius 10 cm, maximum toroidal field 1.5 T (T/2 = = 70 ms) - is described. The device obtained from the Institute of Atomic Energy in Moscow was put in operation in the IPP in Prague in September 1977. Up to now we reached the nominal parameters of operation with maximum plasma current in stable regime about 30 kA (pulse length 8.5 ms). For typical value of toroidal magnetic field 1.3 T and loop voltage 2.5 V the safety factor on the plasma column surface $q \simeq 3$ was achieved. Typical values of plasma parameters on the axis are following : $N_e(0) = (3\text{-}5).10^{19} m^{-3}$, $T_e(0) \simeq 300$ eV, $T_i(0) \simeq 100$ eV. The present aim of works carried out in this tokamak is a hf plasma heating at frequencies in the region of lower hybrid resonance ($\sim$1 GH at a power level several tens of kW.

As a launching element inside the liner two helix slow-down structures in shadow of limiter were placed. This structures are fed by coaxial line fro hf pulse generator (f = 1.25 GHz, τ = 0.1 - 2.0 ms) with a power up to 50 kW. Using this frequency the ratio $f \simeq 2f_{LH}$ on the plasma axis was reached. Under this condition a preliminary heating experiments give a small increase of ion temperature $\Delta T_i/T_i \lesssim 10\%$ which is in good agreement with similar experiments performed in France and Japan. This increase was observed by a five channel charge-exchange analyser.

For the next future heating experiments directly on the lower hybrid, that is under condition $f \simeq f_{LH}$, are planned. For this purpose we will use the generator with frequency f = 600 MHz at power level about 50 kW. We believe that generator with a power several hundreds of kW, maybe even order of 1 MW, will be available not latter than in 1982.

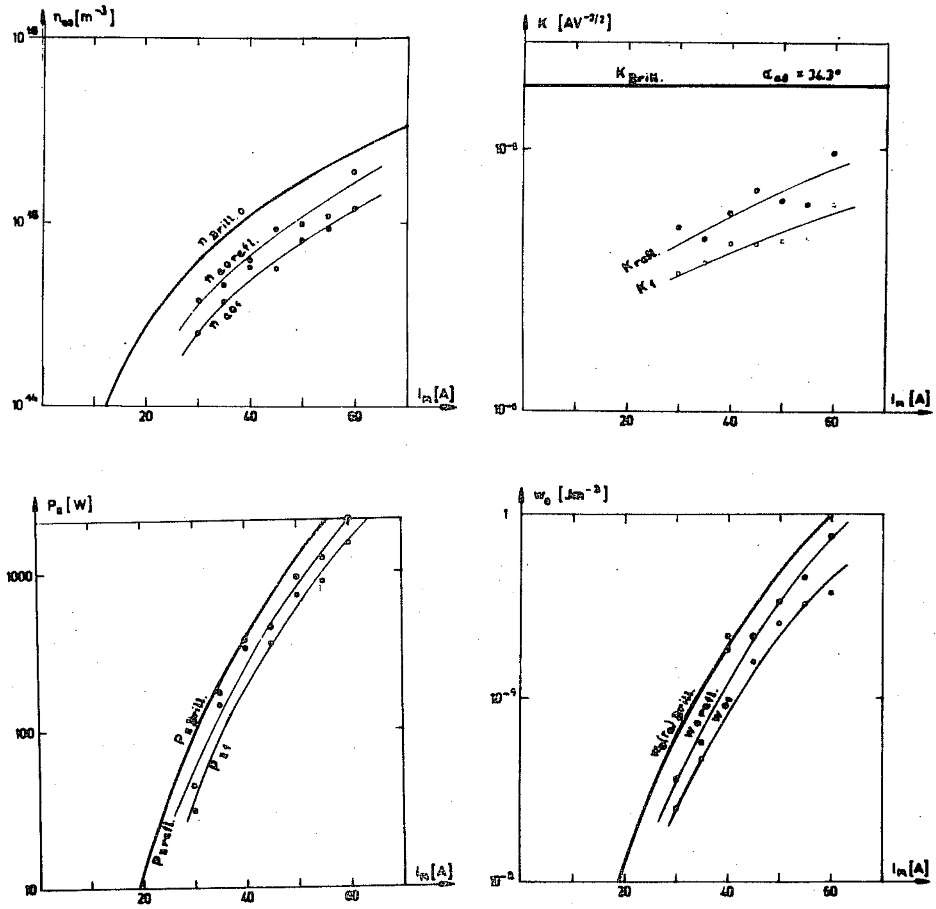

Fig. 1