

Tokamak GOLEM for fusion education – chapter 10

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The GOLEM tokamak is the oldest still operational experimental device in the high temperature tokamak plasma physics. Currently its main mission is to be an educational device to train future thermonuclear fusion specialists. The GOLEM is unique thanks to its remote-control system [1], which allows to carry out the discharge and instantly process experimental data remotely. This contribution is devoted to the current experimental projects of the students:

- Calibration of the ball-pen probe [2] and measurements of plasma parameters in H and He plasma, based on a shot-to-shot method using movable combined probe head composed of the ball-pen and Langmuir probes. Configuration allows measuring profiles of el. temperature, floating and plasma potentials. In the case of He plasma, it is the first measurement of this kind.
- Mass spectrometer PrismaPlus. Integrating of the spectrometer to the system will make the automatic data collection possible, with applications, e.g., calibration of the pressure gauge and improvement of wall conditioning methods.
- The parallel Mach number is measured using the double tunnel probe. It is found that the confined plasma rotates opposite to the plasma current with $M \sim 0,1-0,5$ and the rotation direction tends to reverse toward the plasma edge.
- Double rake probe for studying plasma turbulence. Edge plasma potential biasing is a way to induce shear flows that suppress the turbulence. Double rake probe is used as main diagnostics to measure particle flux in poloidal and radial directions.
- Research on runaway electrons (RE) is focused on two topics: i) segmented semiconductor detector placed in vacuum chamber for various measurements and ii) probe based on scintillating materials alternating with heavy absorbers able to measure RE energy.

[1] Tokamak GOLEM, Czech Technical University in Prague, <http://golem.fjfi.cvut.cz/wiki/> [online]

[2] J. Adamek, J. Stockel, J. Hron, A novel approach to direct measurement of the plasma potential (2004).