Tokamak GOLEM for fusion education - chapter 13

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The GOLEM tokamak is the oldest operational tokamak worldwide. Currently it serves mainly as an educational device. GOLEMs most unique feature is its remote-control system [1]. This contribution is devoted to the current experimental projects of students.

A new motorized manipulator allowing both the radial and angular profile measurements is installed at the GOLEM tokamak. A scan of ion saturation current flows at various angles with respect to the magnetic field is performed and measured using double tunnel probe. Results are compared with existing measurements based on a Gundestrup probe. **A new external plasma stabilization system** was installed at the GOLEM. Compared to the previous one, the new stabilization windings have more turns per coil to create a stronger magnetic field. New fast cameras have also been added, which can now be used to reconstruct the plasma position and compare it with the position obtained from the data from the Mirnov coils. **The electron temperature is estimated based on the expanded calibration database of 2D3V PIC code of the tunnel probe.** By the interpolation of current ratio measured experimentally, the electron temperature can be calculated with a high temporal resolution. The results are cross-checked by a comparison with other electron temperature measurement methods. **Visible plasma tomography** is being implemented on the GOLEM tokamak using a newly installed pair of fast cameras. The camera setup is currently undergoing calibration. The goal is to achieve partial automation of tomography measurements that can be performed remotely. Relationship between macroscopic plasma parameters and **magnetic islands generation** is studied. Strong correlation with plasma current is observed. **Runaway electron studies** using semiconductor detectors and calorimetric probe. **A video about the GOLEM tokamak vacuum system**is being created as the first in a newly emerging series of methodological materials for tokamak technology relevant educational purposes

References

[1] Tokamak GOLEM, Czech Technical University in Prague, http://golem.fjfi.cvut.cz, accessed 25.02.2022