Recent results from the GOLEM tokamak. 'Indeed, you can teach an old dog some new tricks.'

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GOLEM - 'an old dog' (former TM-1, TM-1-MH and CASTOR) is the second oldest tokamak device to be ever built and also the oldest one still operational. In its present configuration, it is a small, iron core, ohmically heated, limiter tokamak operated in a university environment. Although, it is not as significant as other devices with respect to its size and plasma performance, GOLEM (R = 0.4 m, a = 0.085 m, Bt < 0.5 T, Ip < 4 kA) is a viable platform for implementing a number R&D projects highly relevant to fusion. Firstly, the essential element of the present GOLEM operation is its capability to be controlled almost fully remotely via the Internet. This is allowed by a set of hardware and software tools which together with a tokamak operation simulator and a virtual model of the device massively increase its educational and training outreach [1]. Recently, first performance tests of a magnet, winded from the new generation of high temperature superconductors (Re)BCO, in a tokamak environment have been conducted on GOLEM. A simplified equilibrium reconstruction code (based on ref. [2]), has been developed in order to obtain a better estimation of plasma position. As the GOLEM transformer core is made of iron, it was also necessary to develop an appropriate model for its ferromagnetic core. Good correlation between the theoretical model and magnetic measurements has been achieved. First tests of the high temperature resistant (<300°C) Hall sensors in a tokamak environment are being prepared on GOLEM. These sensors are one of the candidate solutions for measurement of stationary magnetic fields in fusion reactors. The contribution will provide an overview of these recent achievements.

References

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