

The tokamak GOLEM practical training course GOMTRAIC 2013

An application to the FUSENET WP7 programme

”Further use of the hardware that was set up with FUSENET financial support”

Abstract

The GOLEM tokamak at the Czech Technical University in Prague (former CASTOR) became a training facility for local as well as for foreign students. A unique feature of this tokamak is the possibility of a full remote participation and control through internet access. Basic remote control of any planned experiment is possible either in the online mode via WWW or SSH interface or in the offline mode with the batch processing code, allowing to adjust the necessary discharge parameters and to run the discharge. The remote participation of several foreign universities in Hungary, Belgium, Poland, France and Costa Rica was successfully performed and is documented on the web page of the department of physics (<http://golem.fjfi.cvut.cz>). The aim of the proposal is to organize the GOMTRAIC 2013 course.

Contact data of person responsible for the application

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GOMTRAIC ..

... stands for Golem reMote TRAIning Course and is offered by the Faculty of Nuclear Sciences and Physical Engineering, at the Czech Technical University in Prague. The faculty’s small tokamak Golem can be fully operated remotely via the internet. It has been used for many face-to-face experimental fusion summer schools over the past years, and now the faculty is using this experience to pioneer a remote training course. GOMTRAIC aims at Masters and PhD students with an interest in experimental tokamak physics. Within three months, they learn how to conduct tokamak experiments and how to operate the diagnostic systems that measure the plasma. The first course started in March 2012 and was advertised through personal contacts and through FUSENET, a European fusion education network. Almost fifty participants registered from all over the world, including India, Croatia, UK, South Korea, Romania, Holland, USA, Hungary, Ukraine, Italy, Mexico, Belgium, Poland, Slovakia, Spain, Bulgaria and Czech republic, altogether 17 countries from 3 continents. They were split into nine groups and each student was assigned to one task according to his or her preference and was guided by an experienced supervisor. A remote kickoff meeting introduced the participants to technical aspects of the measurements. An internet based GOLEM simulator programme helped them learn about the operation of the machine. Although the group never met in person, they communicated via email and videoconference to jointly design the experiments. They met in the virtual control room to perform the plasma measurements, evaluate the data and present a report on their experimental results. The performed discharges were displayed on the website from where the students could download their experimental data.

Frankly saying, this event was not absolutely successful because it coincided with the examination time at universities and students could not concentrate fully for this event.

GOMTRAIC 2013

The second year of the course is going to be enriched with the kick-off in-situ week meeting in Prague, that will certainly help to increase the impact of event. The main goals of the meeting are as follows:

- To learn basic principles of tokamak operation.
- To learn basic instrumentation related to tokamak operation and diagnostics.
- To provide working experience with an integrated tokamak facility, including planning, tokamak control, data acquisition and processing, finalization and presentation of experimental results.
- To provide experience with modern data processing methods, commonly used in today's fusion plasma experiments, in real-life situations.
- To perform several well defined physics experiments addressing basic plasma phenomena occurring in high temperature tokamak plasmas.

Then the second part of the GOMTRAIC course will be carried on in remote mode, where students will have opportunity to continue with their projects started in the kick-off week.

Basic data

Planned start of the event: February.

Level of the practicum: M.Sc. and Ph.D.

Number of participants: up to 20 students.

Special condition: students will be from at least 3 different foreign universities.

Estimated budget

- 5 kEUR for the accommodation of the students and small consumables supporting the tokamak GOLEM operation.
- 1 ppm for the preparation and running of the course, as well as a final report on the use with recommendations.