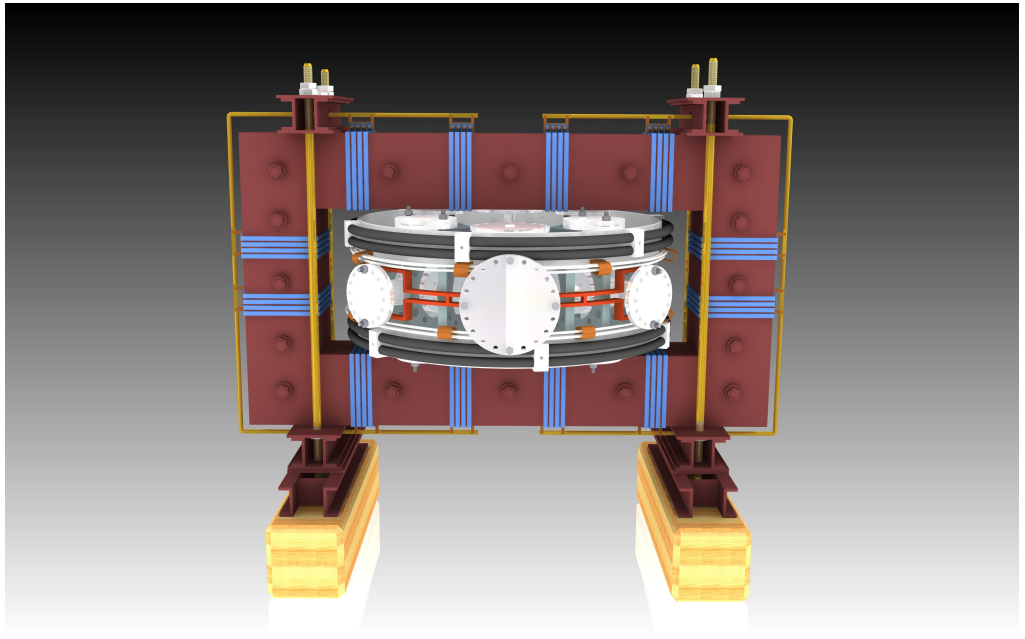
Golem 2012 - from No:6789 to No:10658

Mariánská 2013

Vojtěch Svoboda



Outline

Základní (řádová) statistika k 30.11.2012

Počet dní od instalace: 1815.

Počet operačních dní: $\approx$ 438.

Počet hodin: $\approx$ 1954.

Počet shotů: 10417.

Počet shotů $->$ plazma: $\approx$ 7600.

Průměrná délka výboje: $\approx$ 7 ms.

Základní (řádová) statistika k 30.11.2012

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Počet shotů: 10417.

Počet shotů $->$ plazma: $\approx$ 7600.

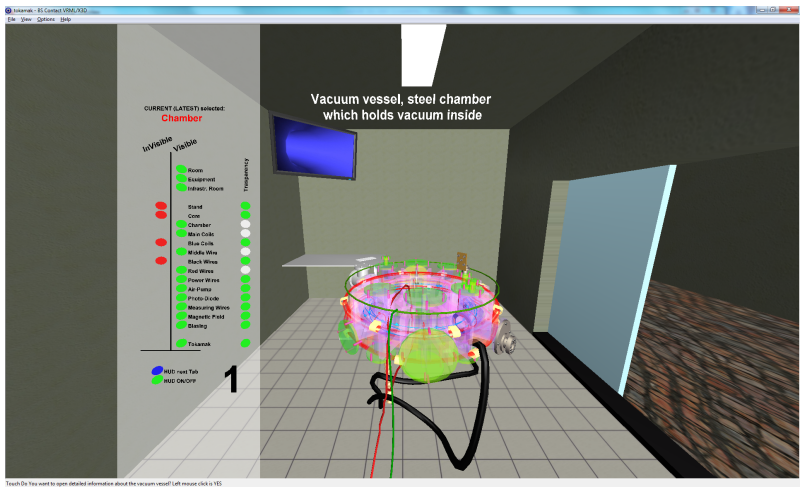
Průměrná délka výboje: $\approx$ 7 ms.

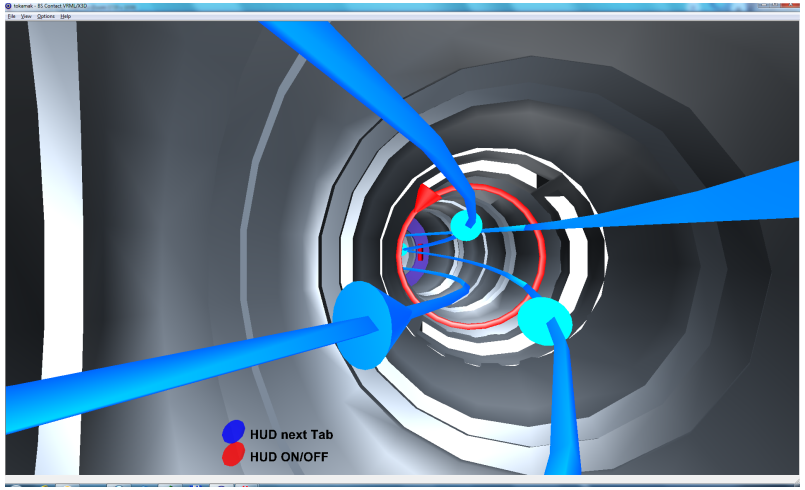
Celková delka trvání plazmatu: $<$ 60 s.

Outline

Virtuální model tokamaku GOLEM

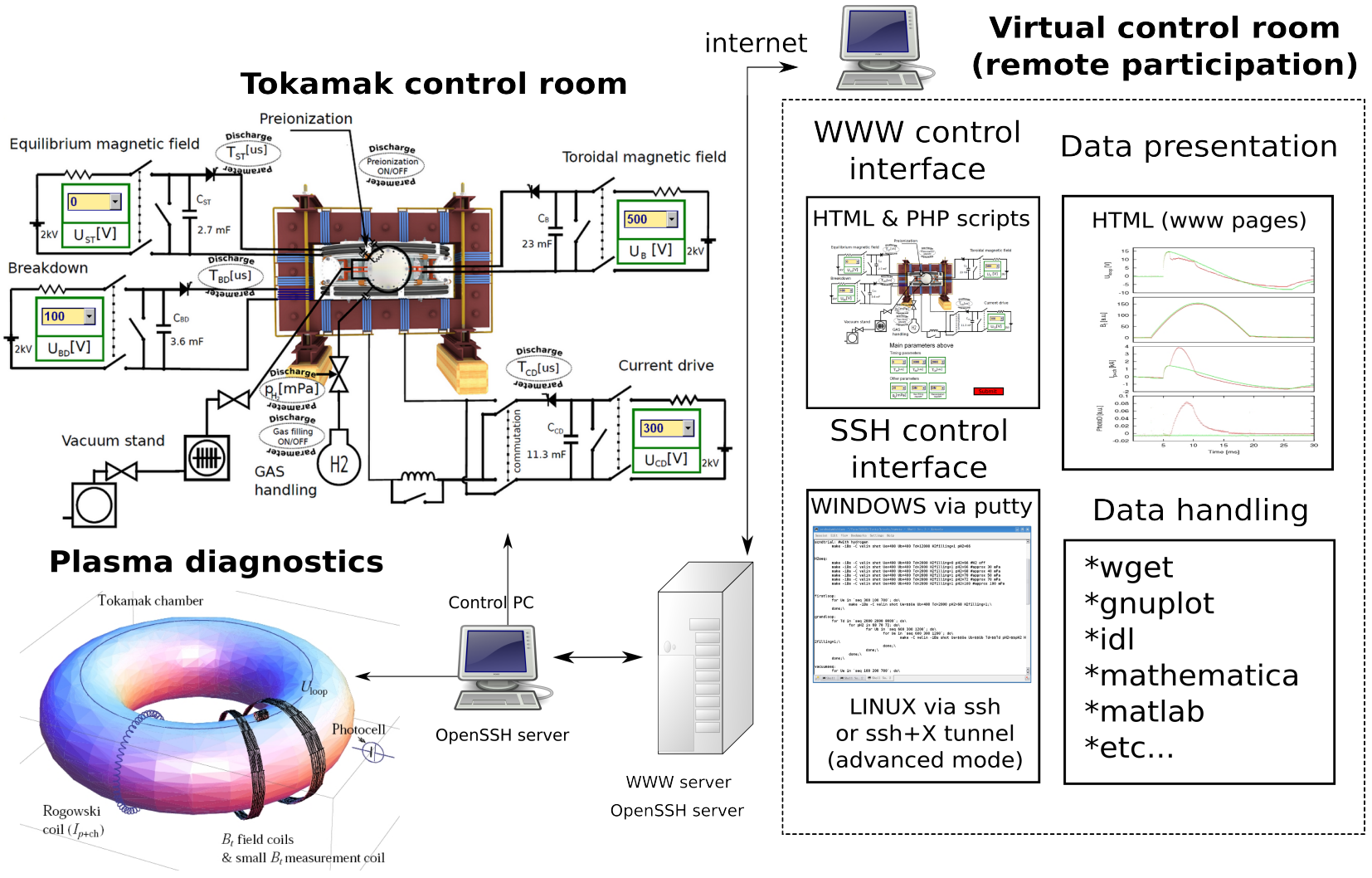
Tokamak & Kondenzátorovna



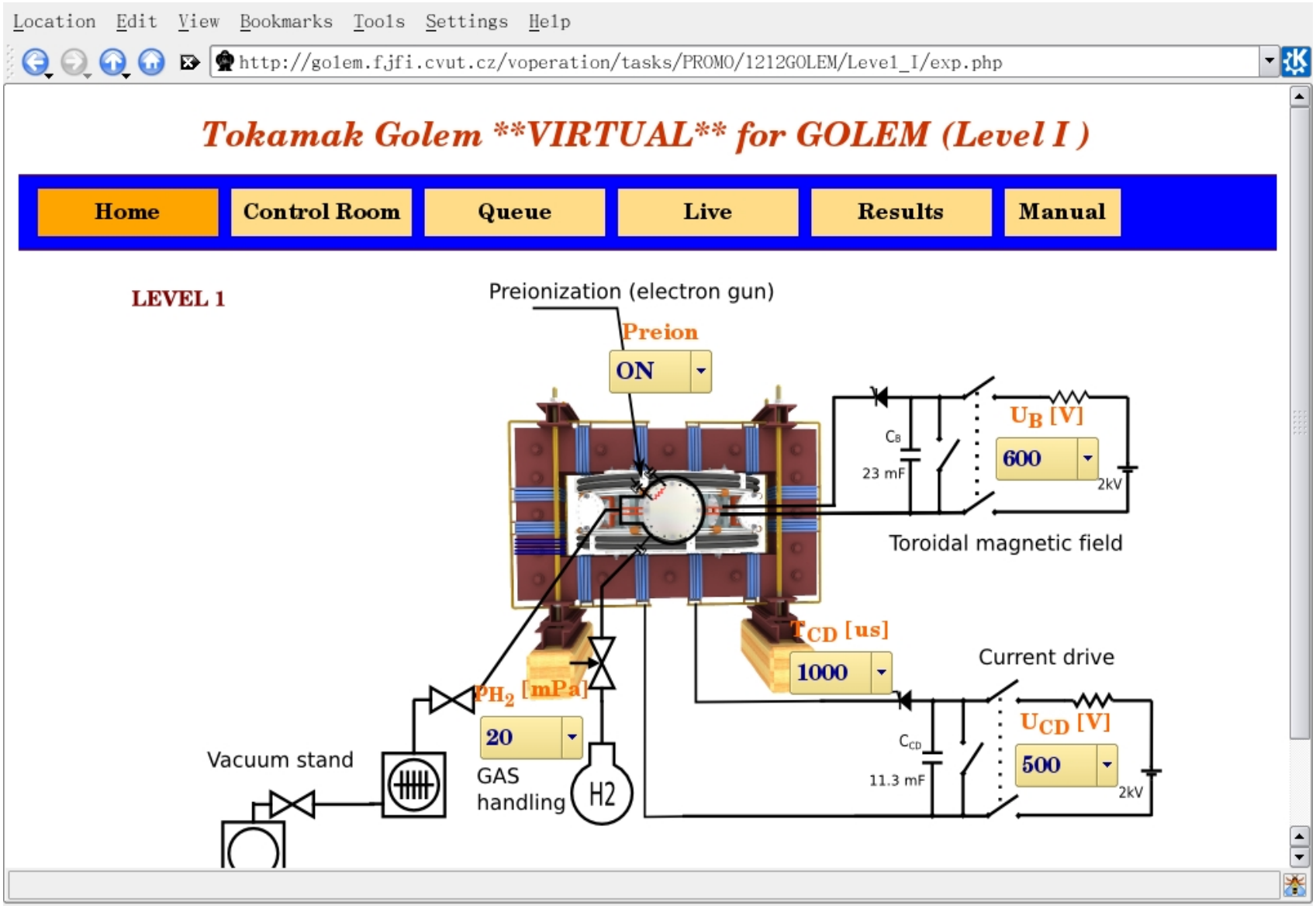


Rozklad do jednotlivých součástí & Pohled do komory

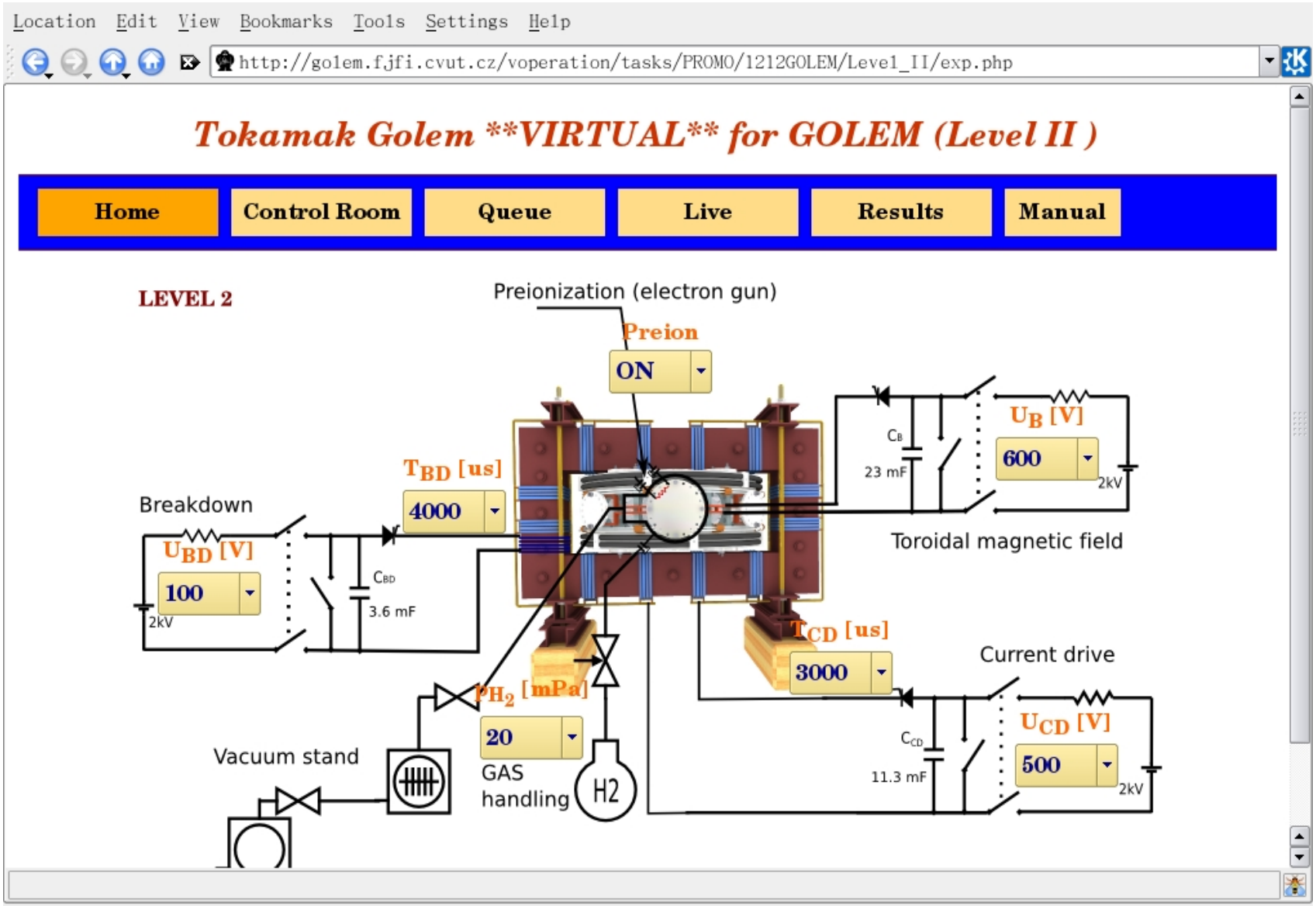
Schéma vzdáleného řízení



Virtuální velín - level I



Virtuální velín - level II



Homepage výboje

GOLEM » Shot #9694 » previous | next | current

Tokamak GOLEM - Shot Database - 9694

[Template source]
[WebLog]

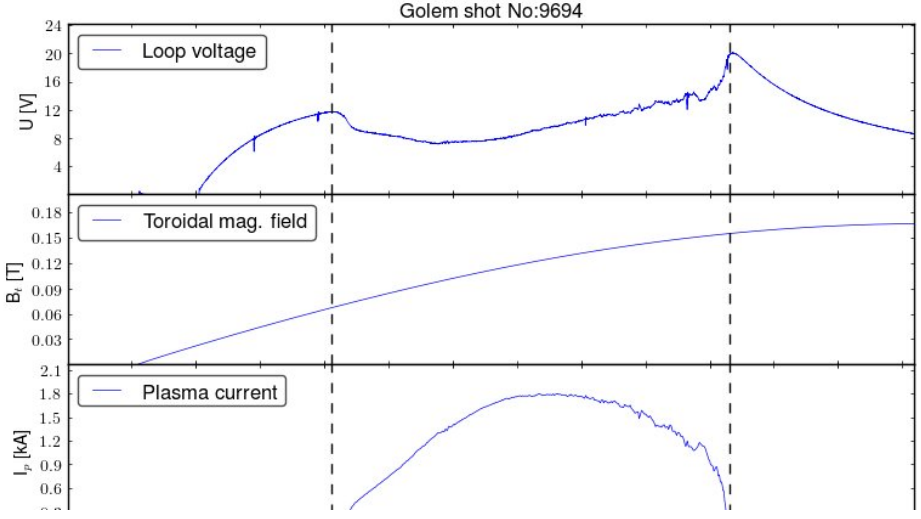
Date: 2012-09-07 - **121544**
Session: Technological/Software/Debugging/0912Optimization
Comment: `USER_A - three`

Basic parameters:

- Chamber pressure $p_{chamber}$: `1.27`-> `19.28` mPa (request: 20 mPa)
- Working gas: `N/A`
- Chamber temperature: N/A C
- C_{B_t} capacitors (23.0 mF) charged to: `600 V`, triggered `5.0 ms`
- C_{BD} capacitors (3.6 mF) charged to: `0 V`, triggered `5.0 ms`
- C_{CD} capacitors (11.2 mF) charged to: `500 V`, triggered `6.0 ms`
- C_{ST} capacitors (2.7 mF) charged to: `0 V`, triggered `5.0 ms`
- Max saturation of iron core transformator: 47%
- Time since session beginning: 0:51:47 h

Plasma parameters:

- Plasma life time **6.2** [ms] (from 8.1 to 14.3)
- Mean toroidal magnetic field Bt: 0.12 T
- Mean plasma current: 1.43 kA
- Mean Uloop: 9.71 V
- Break down voltage: 11.9 V
- Ohmic heating power: 13.87 kW
- Q edge: 7.6
- Central electron temperature: `25.3 eV`



Diagnostics
- ✕ PlasmaPosition
- ✓ Flukes
- ✕ MirnovCoils
- ✓ HXR
- ✓ FastCamera
- ✕ Spectrometer

Analysis
- ✓ AdvancedAnalysis
- ✓ ShotHomepage
- ✕ MagFieldEvolution
- ✕ MultiCWT
- ✕ MHD

DAS
- ✓ NIturbo
- ✓ NIstandard
- ✕ Papouch
- ✓ NIbasic
- ✕ Papouch

Vacuum + Energetics
- Log

Other
- Data
- References
- About

Navigation
- Next
- Previous
- Current

Go to shot
9694 Go

Outline

Golem pro "French Master's in Fusion Science program" (Cadarache 02.2012)

Quotation

... It is fascinating to be able to work on such a device, and we're really enjoying the possibility to make our very first discharges...

ITER news No:2 - Cadarache Training (03.2012)

ITER Newsline
Latest Issue
Newsline Archive
Subscribe to Newsline

News in Brief
New worksite videos
F4E Newsletter March 2012

Links
"InterFaces "
"Worldwide Fusion Links"
"ITER on Facebook"
"ITER on YouTube"

Conferences
02 Dec - 06 Dec, 2012
6th ITER International School
Ahmedabad, India

18 Mar - 21 Mar, 2013
6th Int'l Workshop on Stochasticity in Fusion Plasmas
Jülich, Germany

29 Jul - 02 Aug, 2013
International Conference on Nuclear Engineering (ICONE)
Chengdu, China

16 Sep - 20 Sep, 2013
Int'l Symposium on Fusion Nuclear Technology (ISFNT)

iter newsline

08 Mar, 2012 - #213

view printable version

<< return to Newsline #213

Fusion World

Students command 100 plasma pulses, remotely

-Remy Guirlet, CEA

Participants in the French Master's in Fusion Science program have been hard at work since early February at the nearby IRFM (l'Institut de Recherche sur la Fusion Magnétique), participating in hands-on workshops and attending specialized lectures on magnetic fusion (see Newsline 208).

Putting theoretical knowledge to the test and "driving" a real machine.

For the 2012 edition of this annual intensive program a new hands-on project was proposed: taking control—remotely—of the Czech tokamak GOLEM.

The GOLEM Tokamak, formerly CASTOR, was re-installed in 2009 at the Czech Technical University (CTU) in Prague by Dr. V. Svoboda and his students. The Czech team has implemented a reliable and user-friendly interface with the tokamak control and data acquisition systems, allowing graduate and post-graduate students to become acquainted with the operation of a small tokamak and to propose and perform experiments.

Under the supervision of Dr. Svoboda, GOLEM was (almost) exclusively in the students' hands for one week. More than 100 plasma pulses were performed. By groups of two or three, students studied plasma parameters' roles on performance and worked to optimize parameters to achieve the longest plasma. They also investigated conditioning techniques, ion mass number effects, and energy confinement time. Following data analysis and questioning, students presented the scientific results of their experiments at the end of their hands-on session.

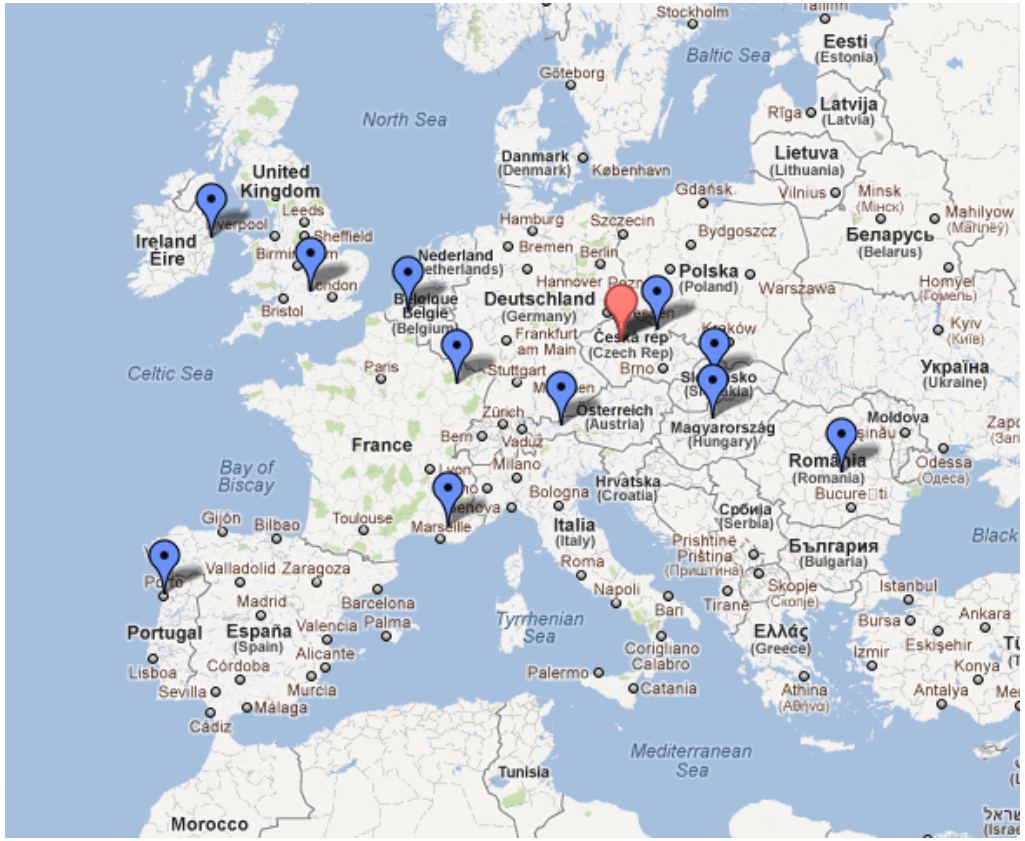
The Master des Sciences de la Fusion is a collaborative training program sponsored by major French institutions of higher education (Aix-Marseille, Bordeaux, Nancy and Paris-Sud Universities, Ecole Polytechnique and CEA-INSTN). Next year's February gathering is expected to draw 40 students, including students from the pan-European Erasmus Mundus Master program.

<< return to Newsline #213

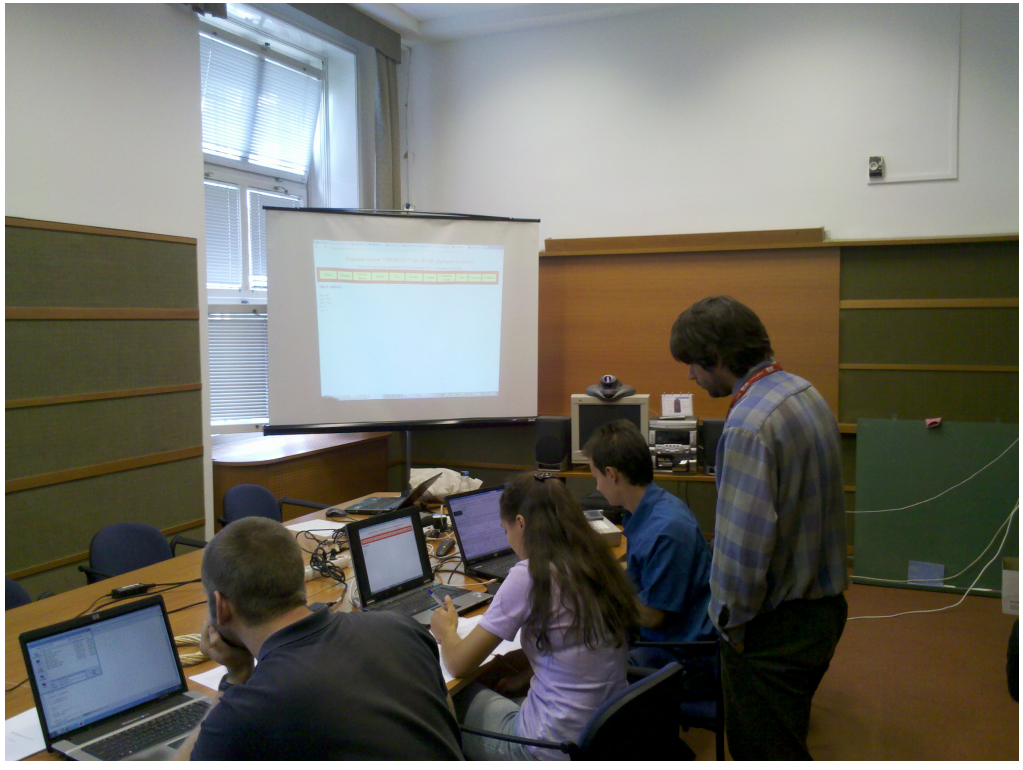
Remote sessions from Europe

The smallest and oldest tokamak ...

... with the biggest control room in the world.



Remote practica (Budapest September 2012) control room in $\approx$ 443 km distance



$\approx$ 50 shots

Quotation

Thanks for the operation! The lab exercise went perfectly well, and the students were really enjoying it. Gergo Pokol (teacher)

GOMTRAIC

- **GO**lem re**M**ote **TRAI**ning **C**ourse.
- Course oriented on basic understanding of experimental tokamak physics and control.
- The basis of GOMTRAIC is remote operation of the GOLEM tokamak operated at the Czech Technical University in Prague.
- Organized for undergraduate and postgraduate students interested in experimental tokamak physics.
- Participants do not need to leave their country to get experienced in tokamak operation. They can participate even from their home. No fee.

Tasks

- Breakdown studies:
- Radial profile of floating potential and plasma density (determination of radial electric field and poloidal plasma velocity)
- Determination of plasma resistivity and electron temperature, variation with different discharge regimes
- Plasma position studies with Mirnov coils diagnostics.
- Role of vertical magnetic field on plasma performance.
- Spectroscopy studies
- First wall conditioning (baking of the vessel and glow discharge) on plasma performance.
- Comparison of tokamak discharges in H and He working gases.
- Generation of runaway electrons at different discharge regimes by means of hard X ray radiation.

GOMTRAIC 2012

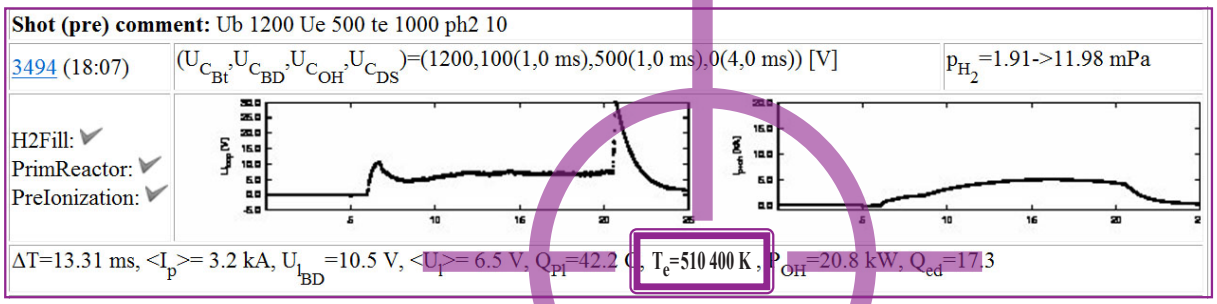
Quotation

... It was wonderful experience for me to do experiment under your guidance. I thank you, the GOLEM team again for yesterday's rack probe experiments. We will thoroughly analyse the shots. ...

Žhavé výstřely

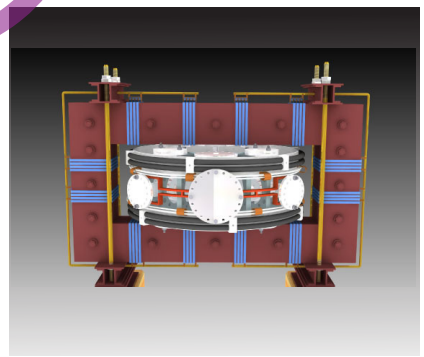
ŽHAVÉ VÝSTŘELY

Studenti a učitelé zaměření FTTF - Fyzika a technika termojaderné fúze vyhlašují soutěž o **nejžhavější výboj na tokamaku GOLEM** (druhý největší tokamak na východ od ČR až po Rusko) ve smyslu nejvyšší dosažené teploty plazmatu.



Ceny: 1-5 cena (vítěz si vybírá první, atd.) :

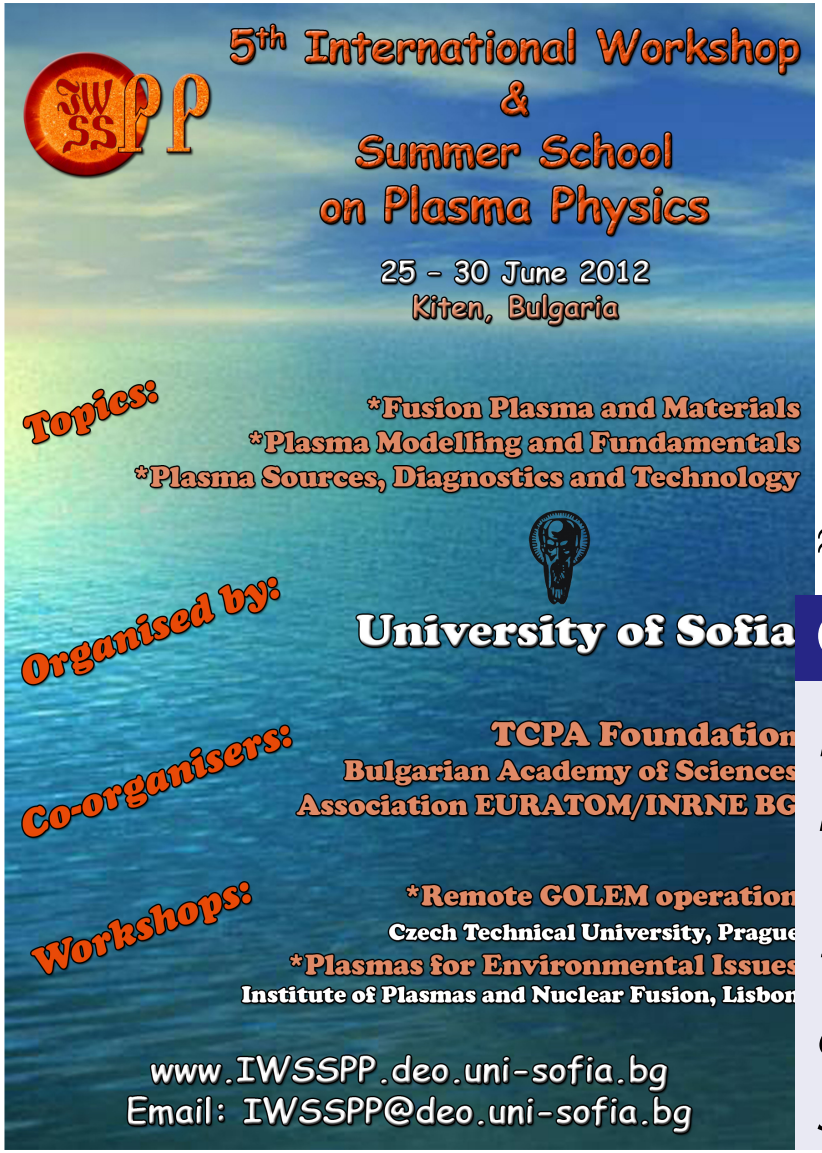
- Kniha "Fúze - energie budoucnosti" s podpisy fúzních odborníků z ČR i světa.
- Předplatné vybraného českého odborného časopisu na 1 rok.
- Osobní foto před tokamaky GOLEM, COMPASS.
- Vstupenky na vystoupení hudební skupiny Tokamak.
- Možnost provedení výboje na tokamaku COMPASS (středně velký tokamak na Akademii věd.)



- Cena útěchy: toroidální koblížek pro každého, kdo úspěšně dosáhne aspoň vytvoření plazmatu.

Výčet toho pravidel

06/12 5th International Workshop & Summer School on Plasma Physics Kiten 2012.



$\approx$ 50 shots

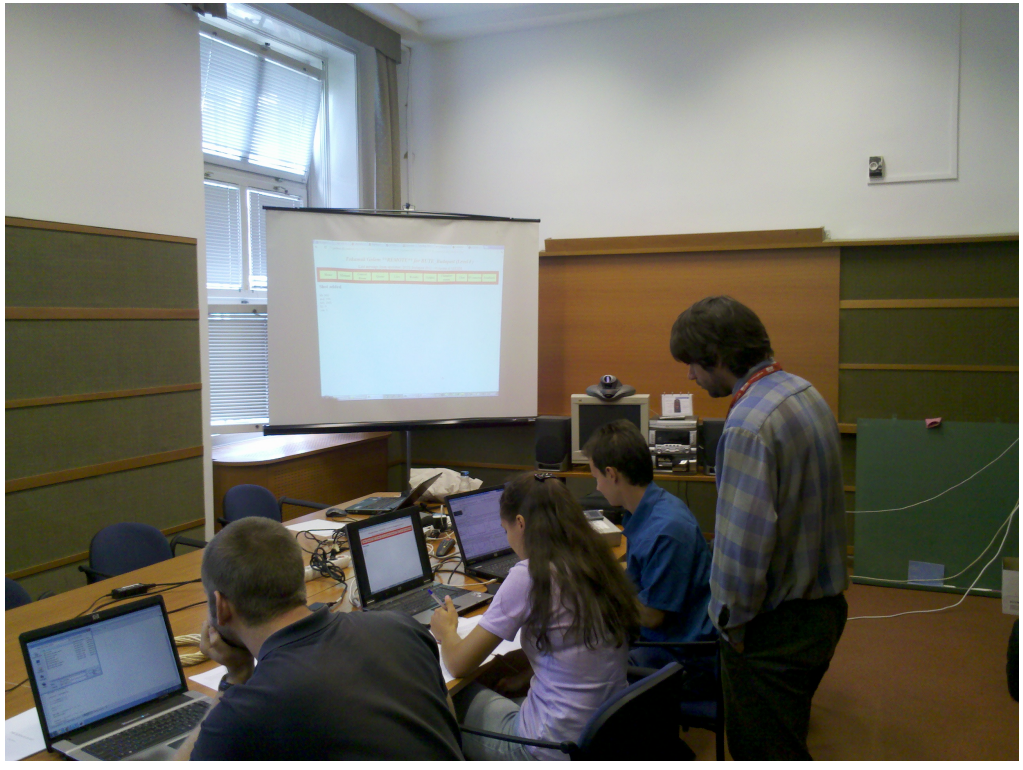
Quotation

I have been present at a remote participation on GOLEM, and I can confirm that the students are very enthousiastic about this.
Jean-Marie Noterdaeme

08/12 SUMTRAIC 2012 at GOLEM

$\approx$ 100 shots

Remote practica (Budapest September 2012) control room in $\approx$ 443 km distance



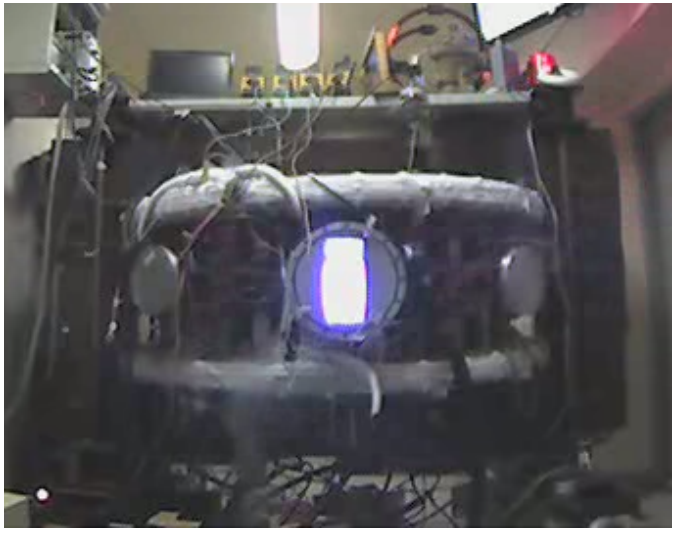
$\approx$ 50 shots

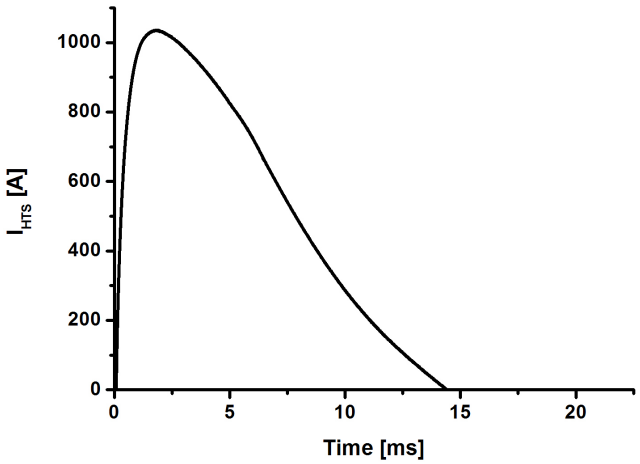
Quotation

Thanks for the operation! The lab exercise went perfectly well, and the students were really enjoying it. Gergo Pokol (teacher)

Outline

High Temperature Superconductors first ever used on tokamak

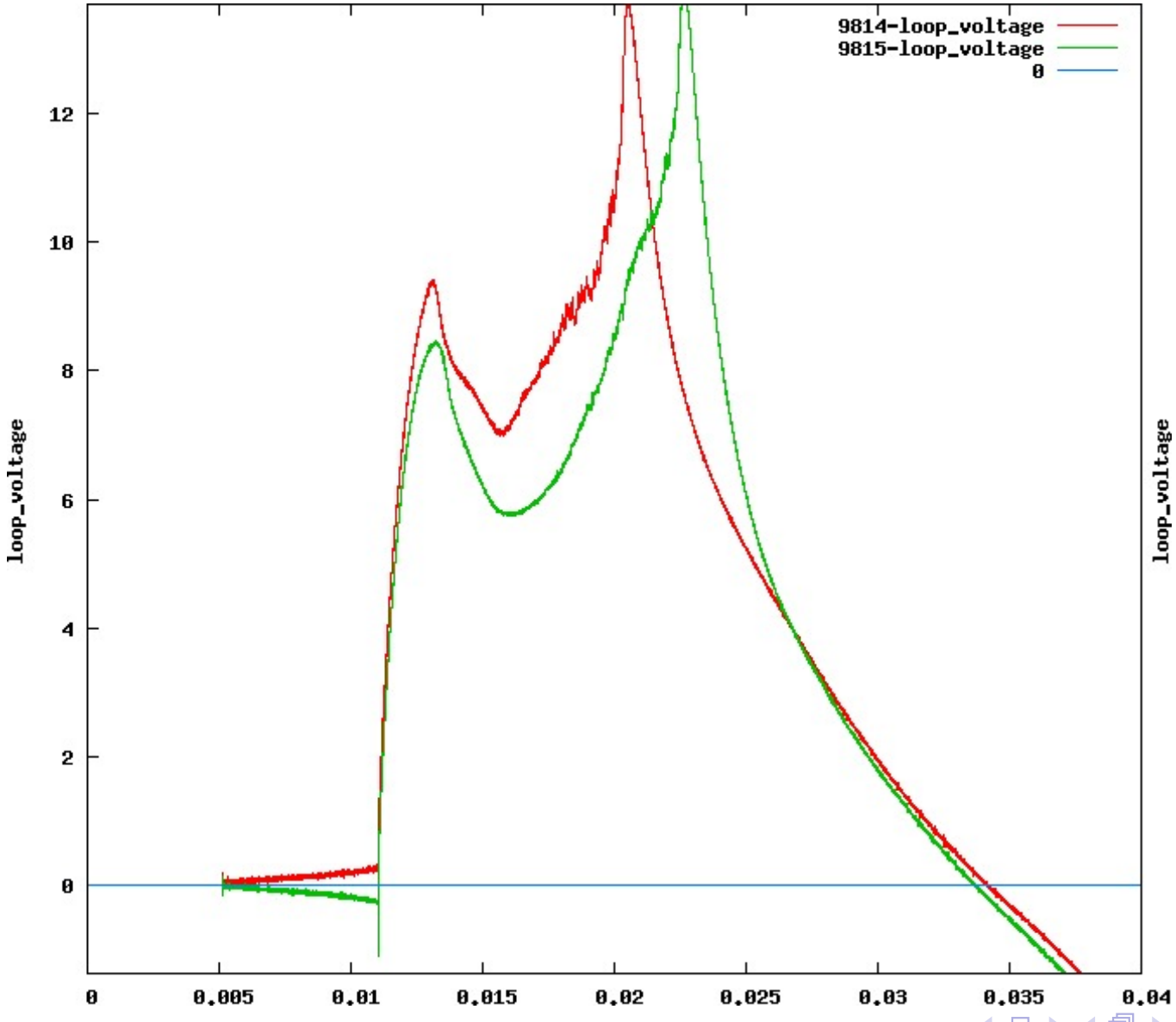




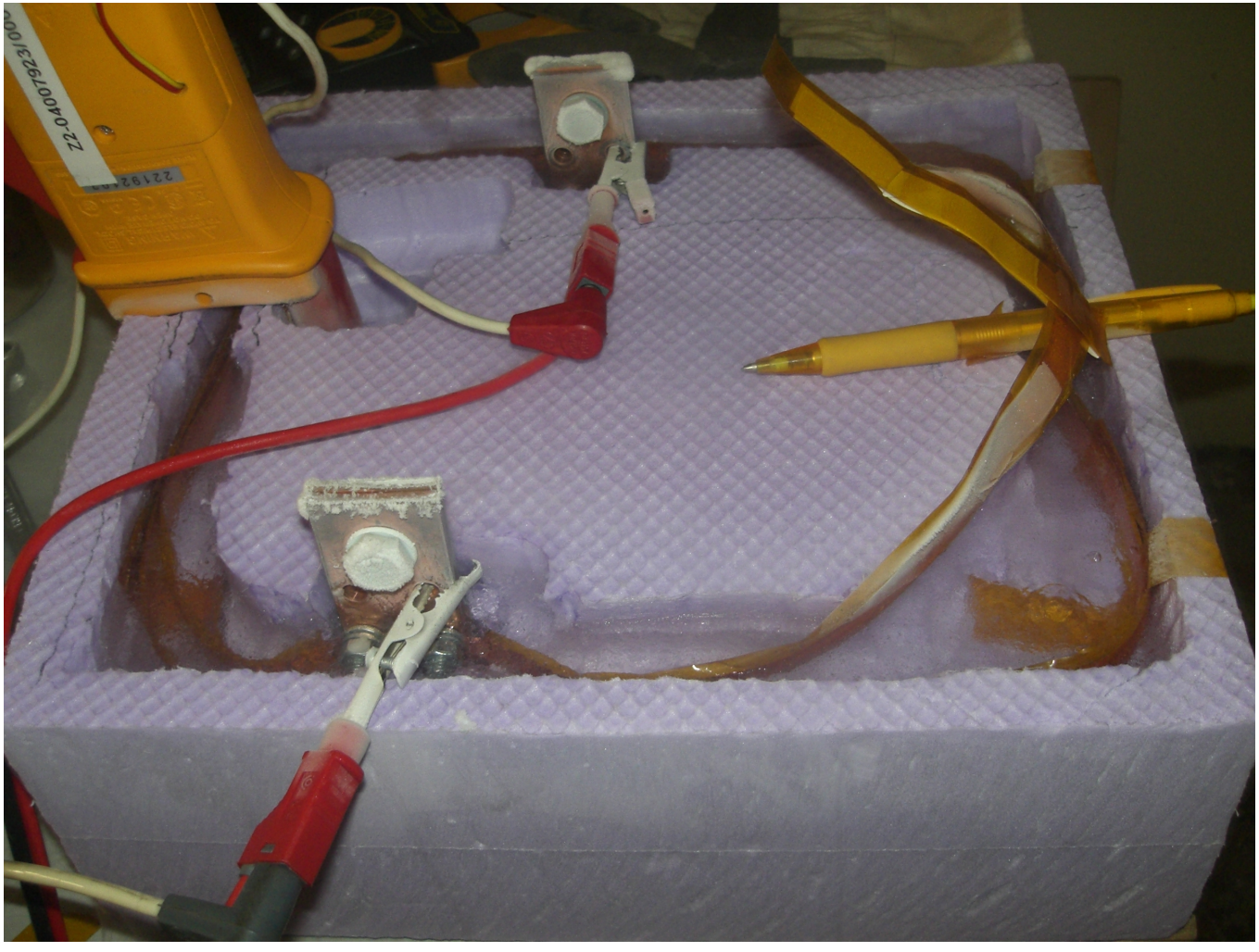
- 6 turns of the 2nd generation HTS (Re)BCO tape SCS12050-AP.
- Current ramp-up speed of up to ≈ 0.6 MA/s .
- Current through the tape ≈ 1 kA.
- Little "quench" effects observed for perpendicular magnetic field up to 0.5T

video

HTS used as a equilibrium field: Plasma & $I_{HTS} = 85A$ (discharge 2 ms prolongation)

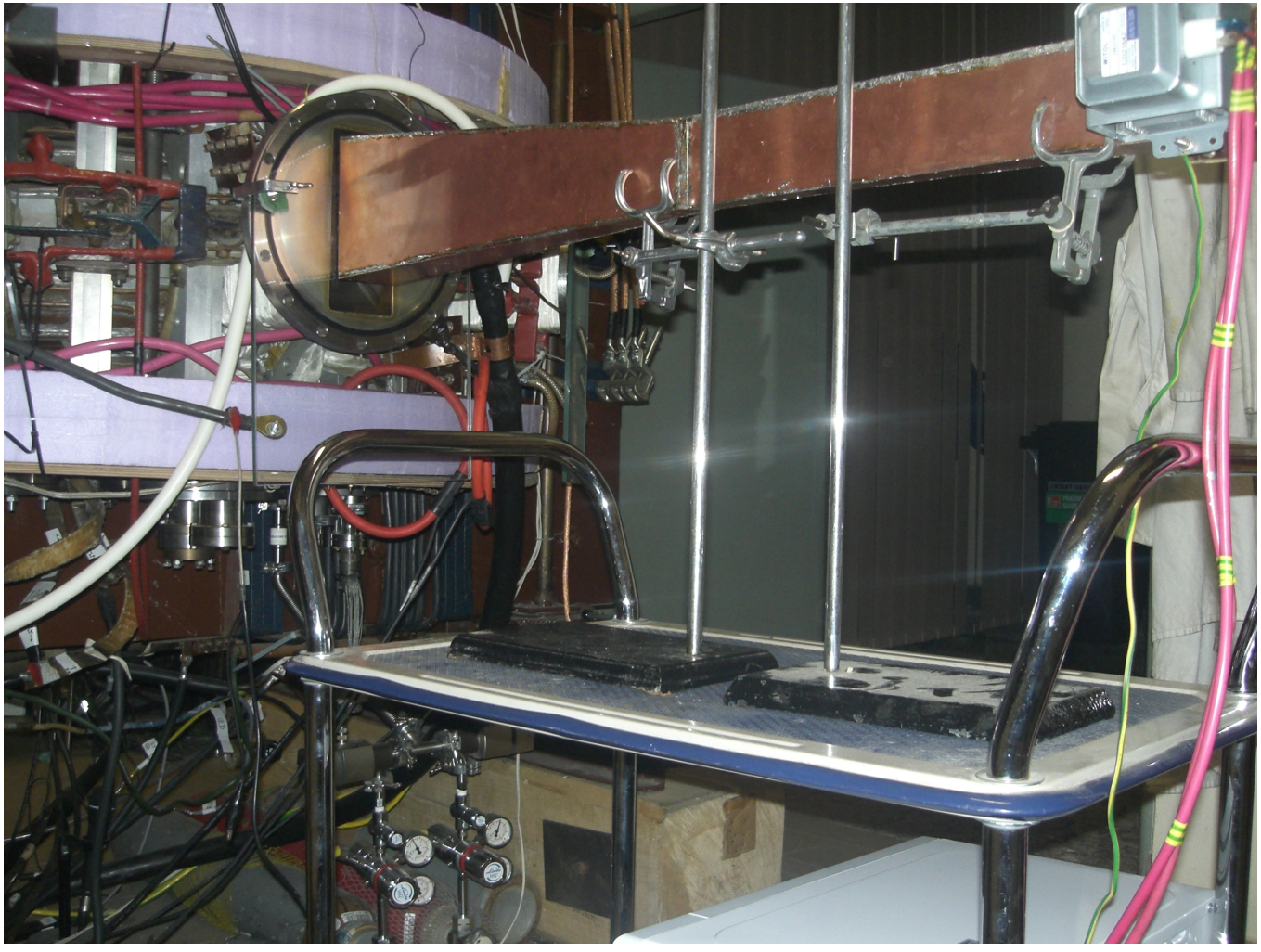


HTS switch step I: Table Top Experiment

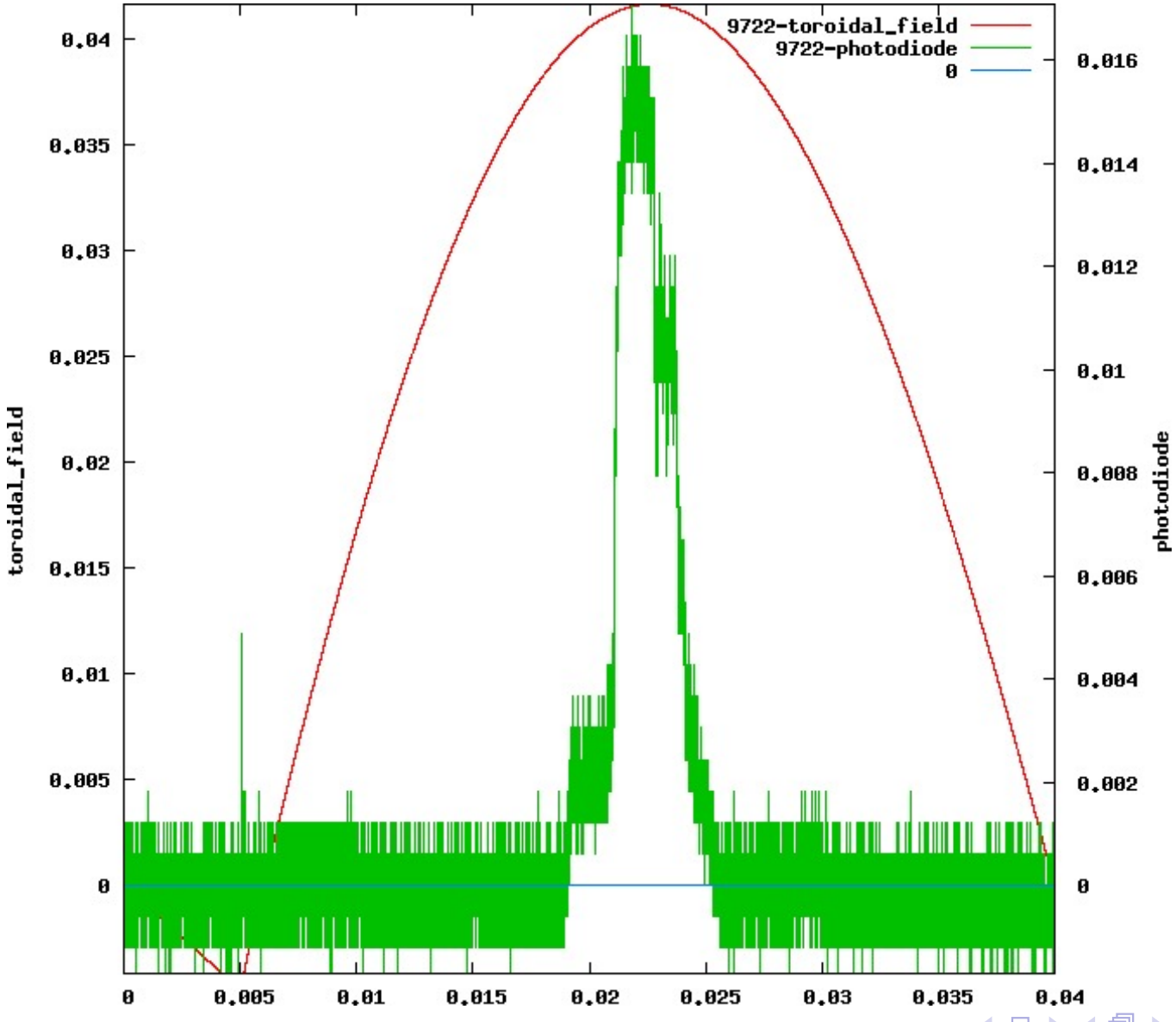


Extremely low inductance (and lack of time) - no results

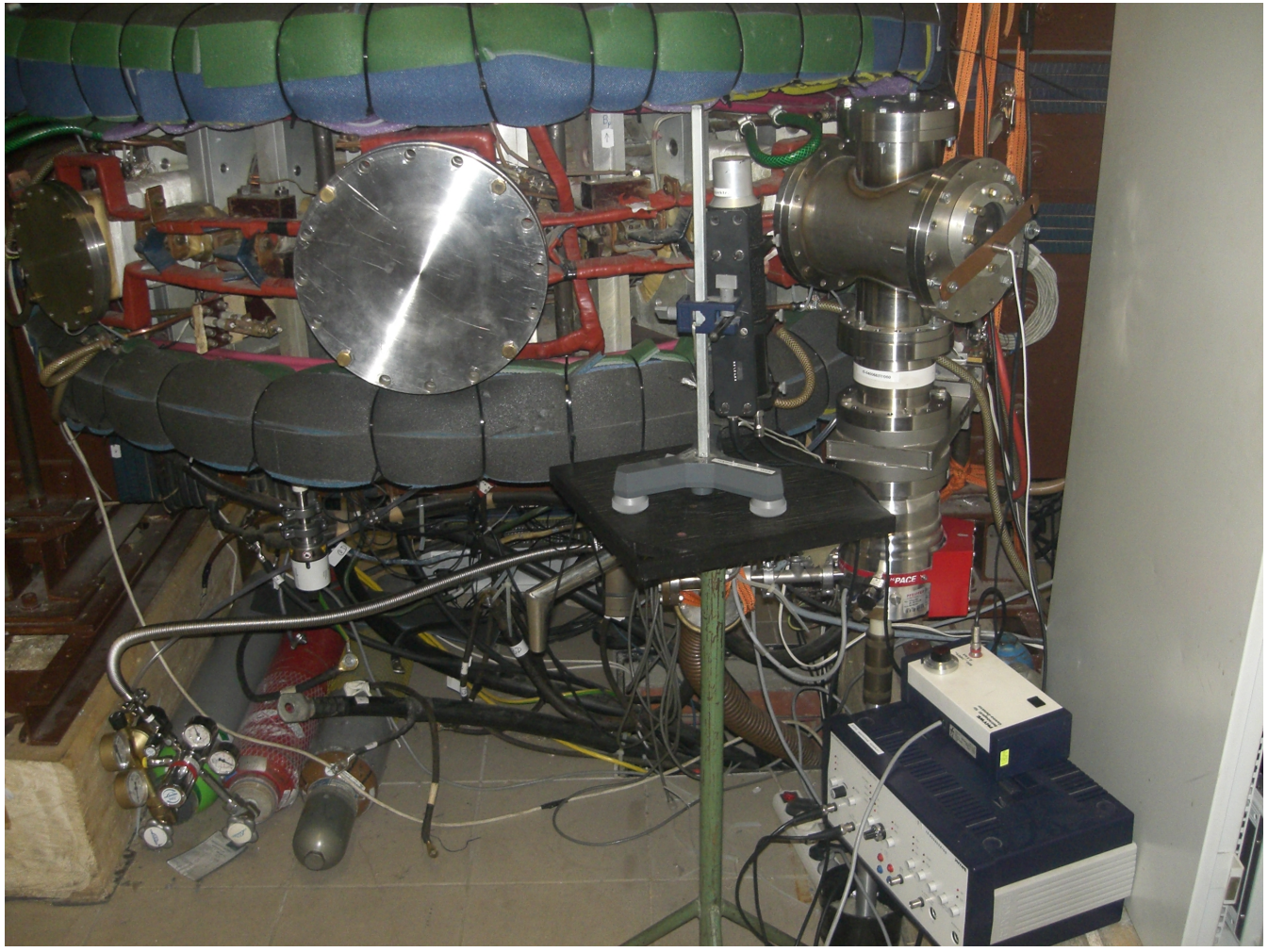
RF preionization



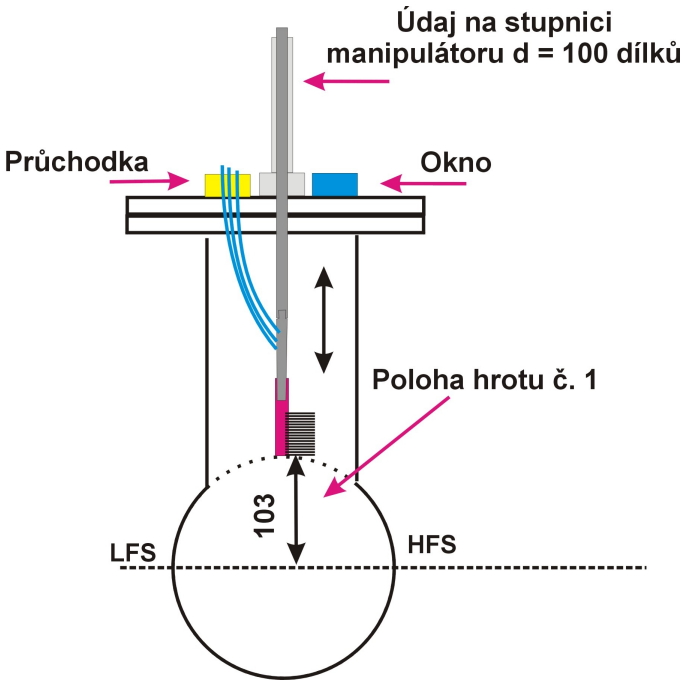
Results (B_t & H_2) ... one hit

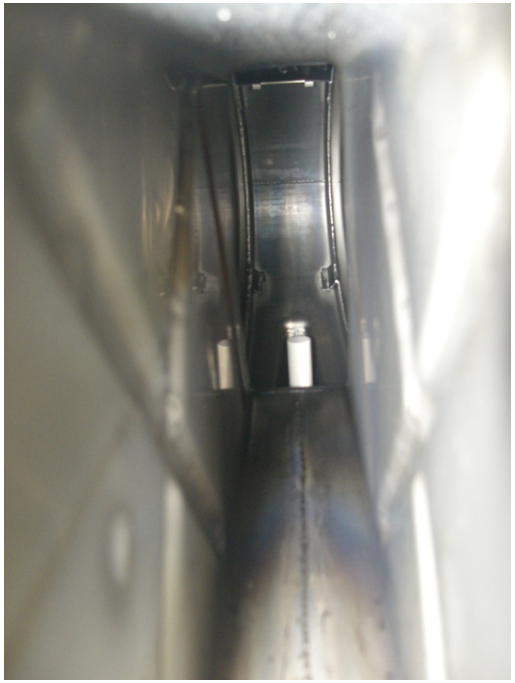


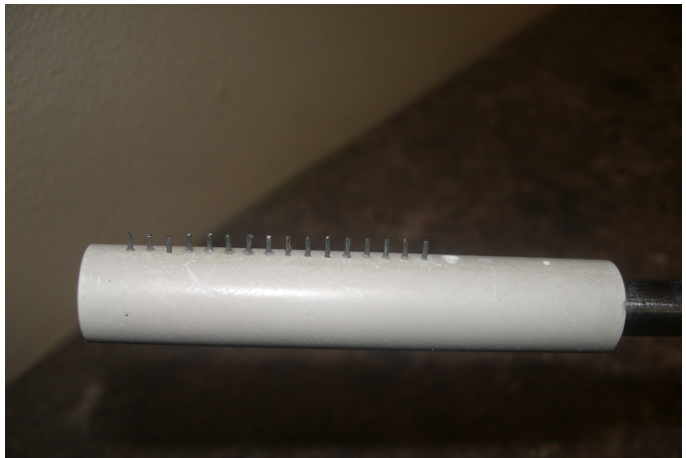
HXR



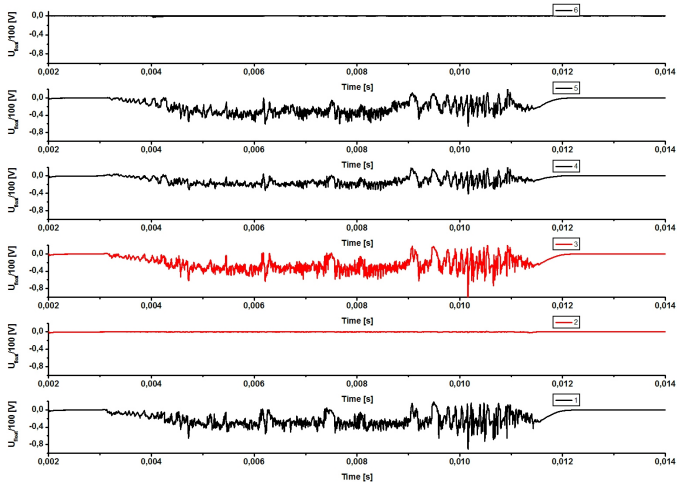
Rake probe (2012)

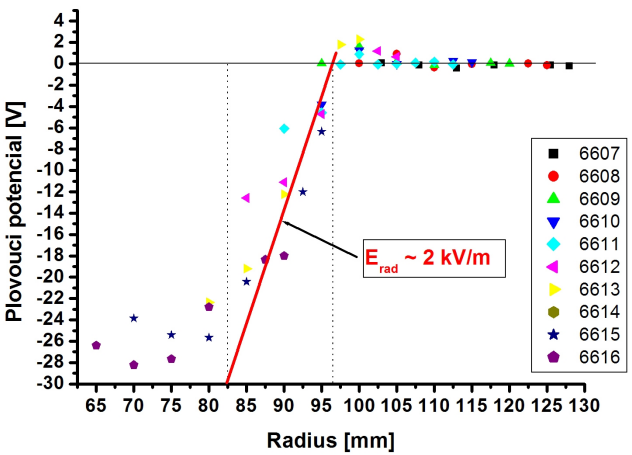


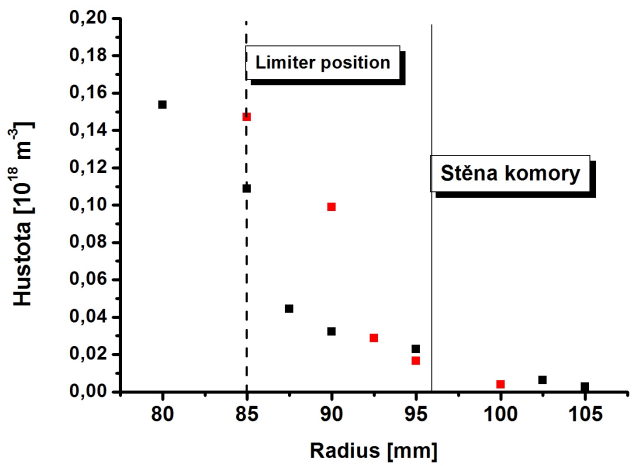




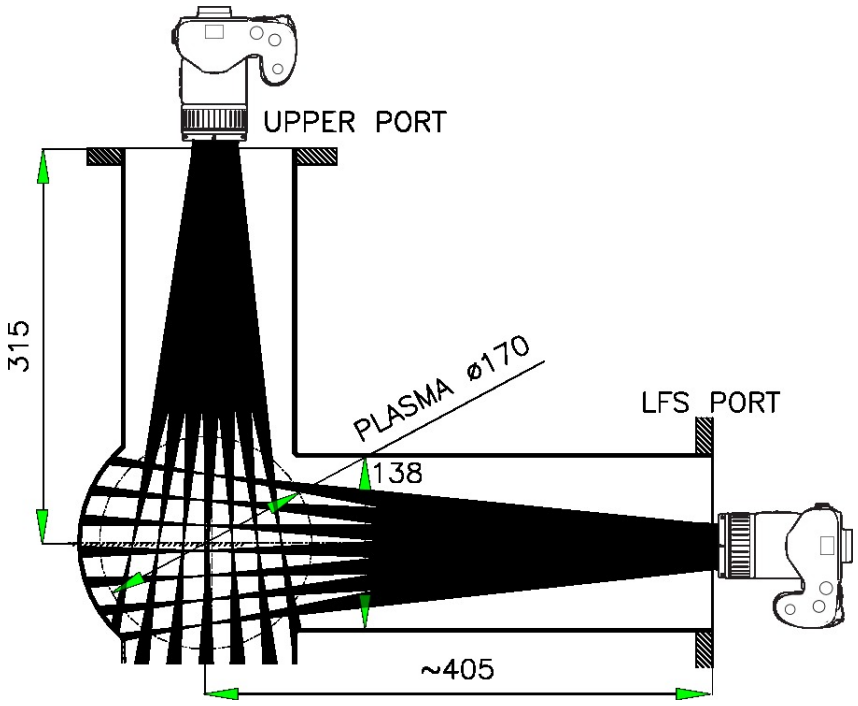
Rake probe (2012) - results

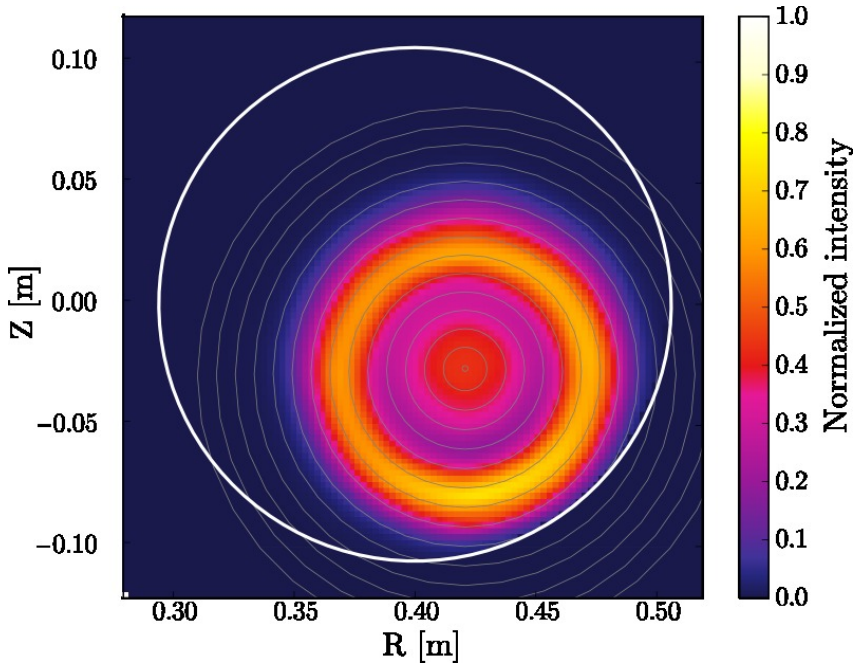






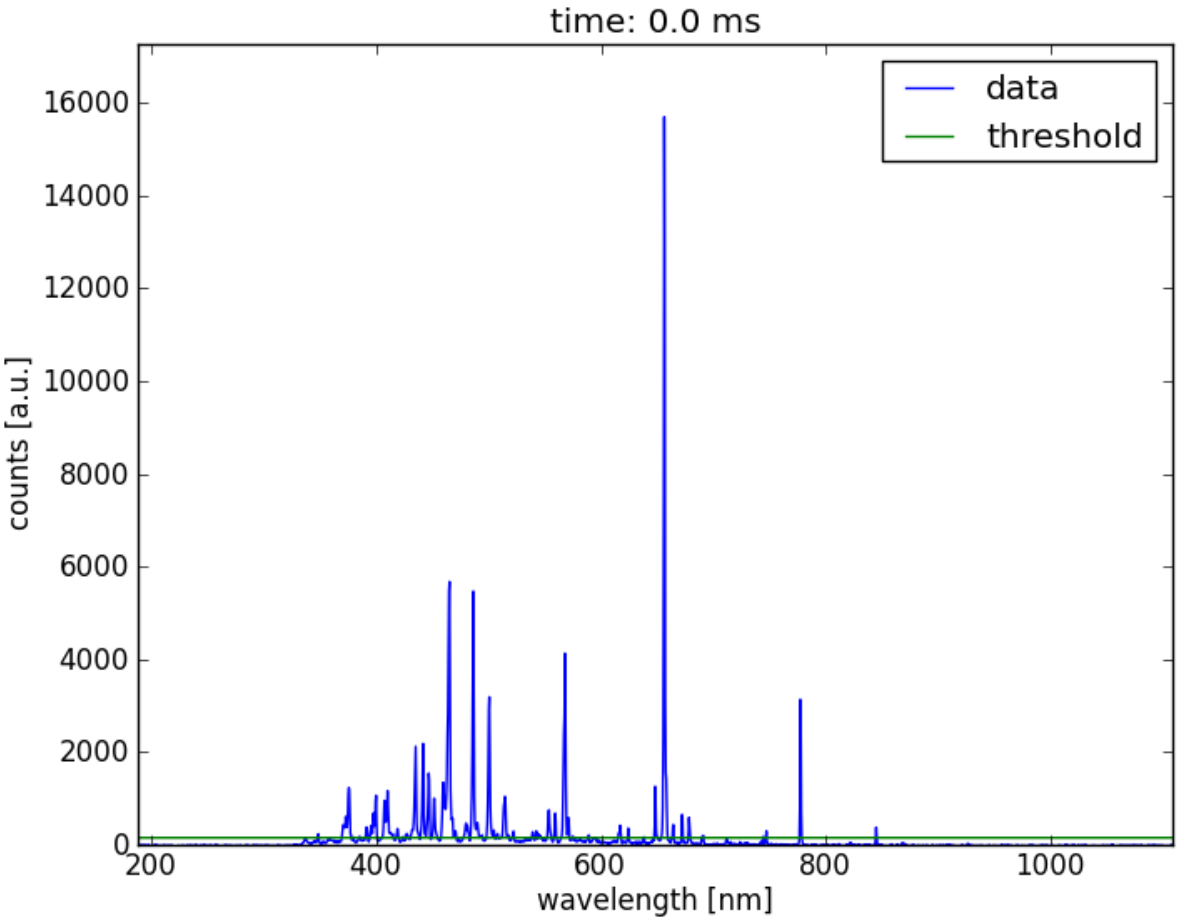
Low Cost Alternative of High Speed Visible Light Camera for Tokamak Experimentsa)





(HTPD conference Monterey + RSI 2012)

Spectra


time: 0.0 ms
data
threshold
counts [a.u.]
wavelength [nm]
0
2000
4000
6000
8000
10000
12000
14000
16000
200
400
600
800
1000

Předpověď 2013

- GOMTRAIC (Fusenet event.)
- Fusion & Erasmus Mundus Masters, Cadarache.
- Týden vědy
- HTS.
- SUMTRAIC

Outline

Poděkování

Vychování: UFP AV ČR, oddělení Tokamak.

Přímo: Gabo Vondrášek, Jan Stöckel.

Studenti nadstandardně: Ondřej Grover, Michal Odstrčil.

Podpora: vedení katedry a fakulty (děkanát).

Domácí zázemí: VS, JS, GV.

GA: MŠMT, Fusenet, IAEA.

Firmy: National Instruments, Pfeiffer.

Nadace VIA

To be continued ....