

Tokamak GOLEM - zařízení pro vzdělávání v oblasti
termojaderné fúze

Vojtěch Svoboda, et al. pro Vědecký jarmark

September 9, 2015

Outline

1 Úvod

2 Termojaderná fúze

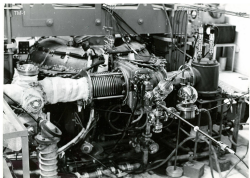
3 Tokamak GOLEM

4 Závěr

Tři éry tokamaku GOLEM

The smallest & oldest tokamak...

Tokamak TM1
@Kurchatov Institute near Moscow
~1960-1977



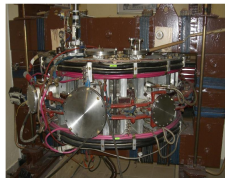
SCIENCE

Tokamak CASTOR
@Institute of Plasma Physics, Prague
1977-2007



**SCIENCE
& education**

Tokamak GOLEM
@Czech Technical University, Prague
2007-



**EDUCATION
& science**

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

Tokamak Golem **REMOTE for MASTER (Level 1)**
The smallest & oldest operational tokamak with the biggest control room in the world

Home	Wiki	Control Room	Queue	Link	Results	GOLEM Diagram	Chamber status	IP cameras	3D model	Chat	Feedback	Help
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LEVEL 1

Preionization (electron gun)

Arise

Toroidal magnetic field

Current drive

Vacuum stand

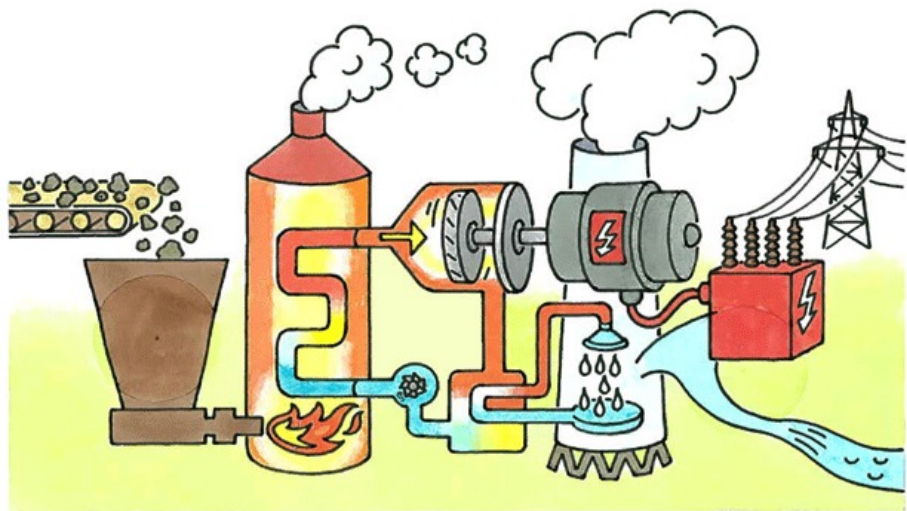
GAS handling

Working Gas (hydrogen)

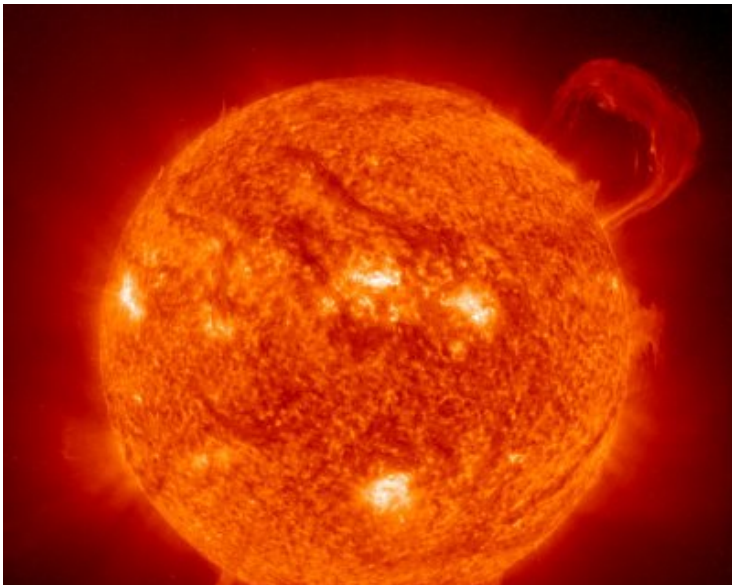
Discharge comment

Place the discharge setup into the queue

Princip Elektrárny



Inspirace Sluncem/hvězdami?



Outline

1 Úvod

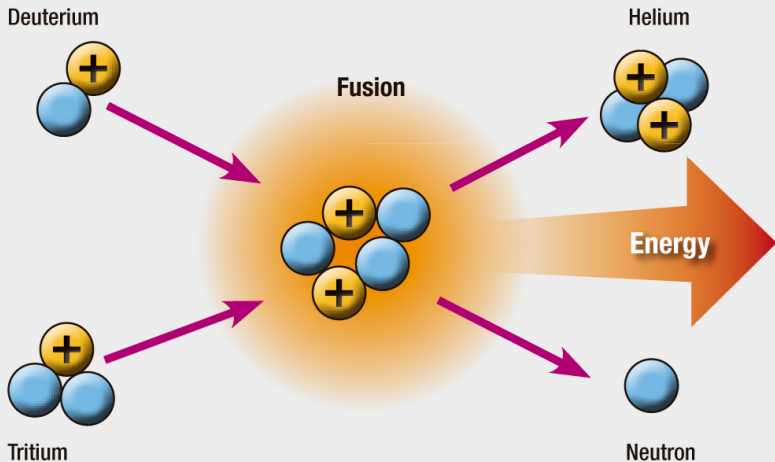
2 Termojaderná fúze

3 Tokamak GOLEM

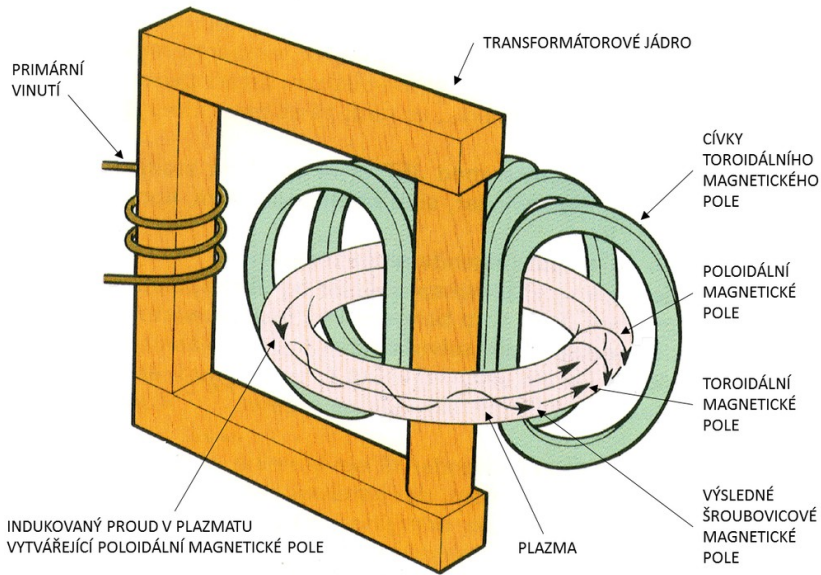
4 Závěr

Zisk energie slučováním lehkých prvků

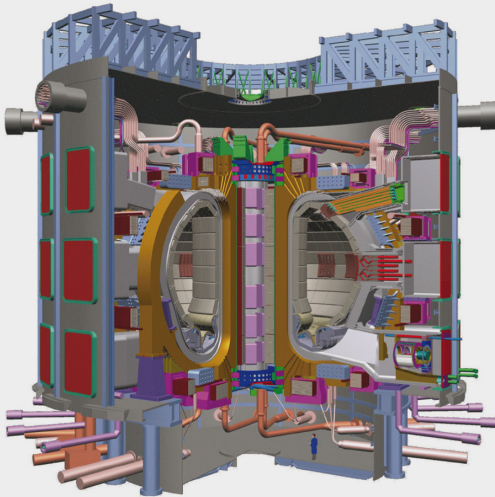
// Figure 1. Schematic representation of the D-T fusion reaction //



Tokamaky



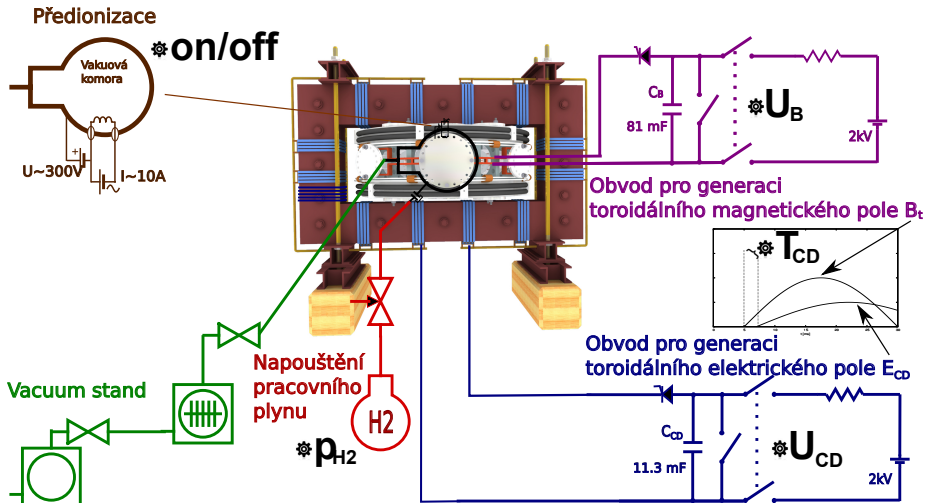
/// Figure 2. General view of the ITER experiment



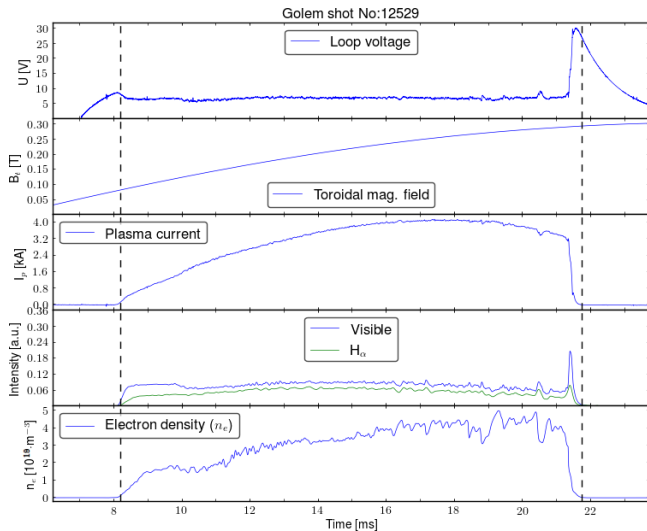
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- 4 Závěr

Infrastruktura Tokamaku



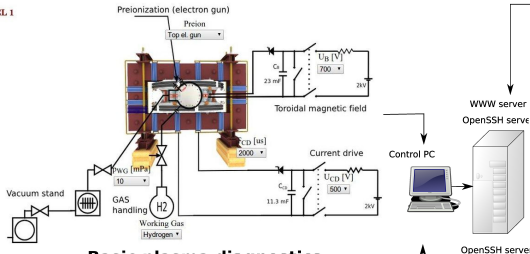
Základní charakteristiky typického výboje #12529



Celkové schéma experimentu

LEVEL 1

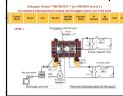
Tokamak technology setup



Virtual control room (remote participation)

WWW control interface

HTML & PHP scripts



SSH control interface

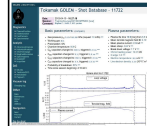
WINDOWS via putty



LINUX via ssh or ssh+X tunnel (advanced mode)

Data presentation

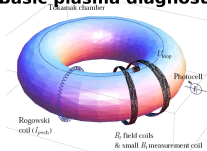
HTML (www pages)



Data handling

- *wget
- *gnuplot
- *idl
- *mathematica
- *matlab
- *etc...

Basic plasma diagnostics



Outline

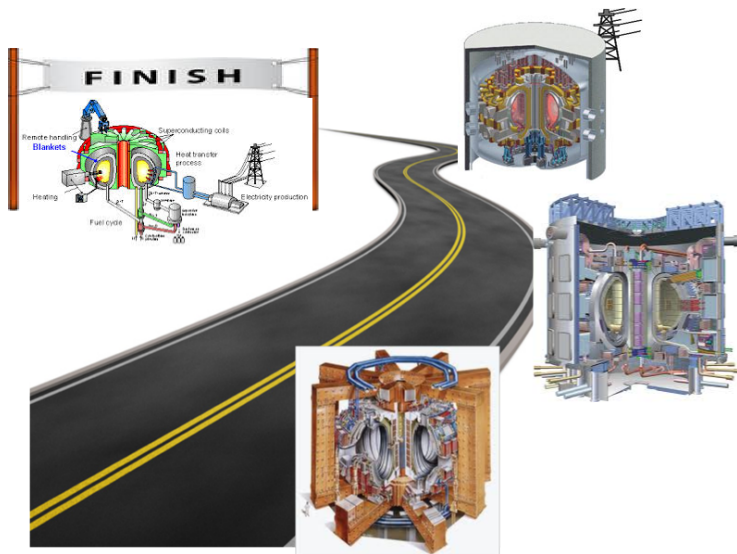
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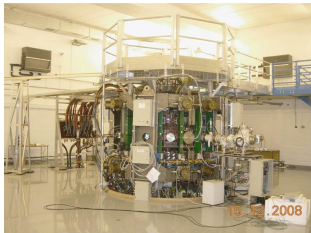
4 Závěr

Cesta k fúzní elektrárně



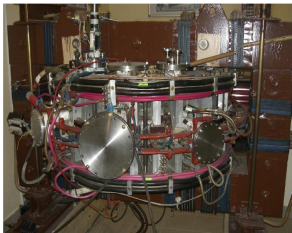
Tři operující tokamaky v České republice

Tokamak COMPASS
@Institute of Plasma Physics, Prague



SCIENCE
& education

Tokamak GOLEM
@Czech Technical University, Prague



EDUCATION
& science

Music group Tokamak
Brno



ENTERTAINMENT