



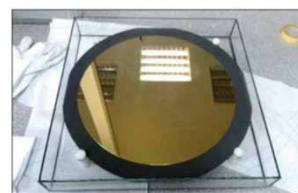
Customized Instrumentation for Large Scale Facilities



Agenda

TOPICS:

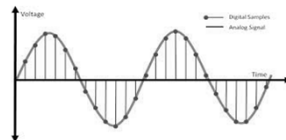
Foton Company



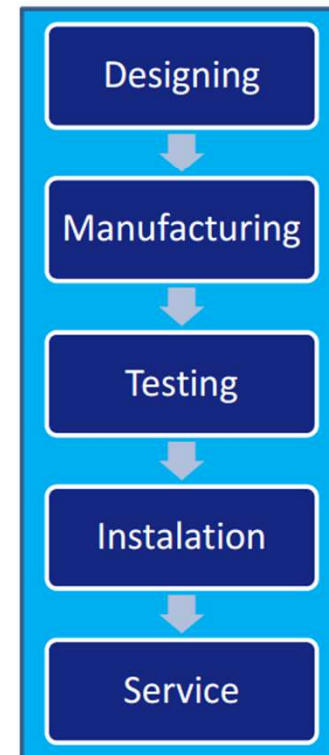
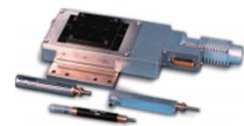
Small Can More

□ „FOTON, s. r. o. was established in 2000 with the mission to deliver high-tech products and professional services in the field of scientific instrumentation”

- private R&D company
- proven quality
- diverse staff backgrounds
- over 15 years of tradition
- around 200 prototypes
- flexibility



Product Overview

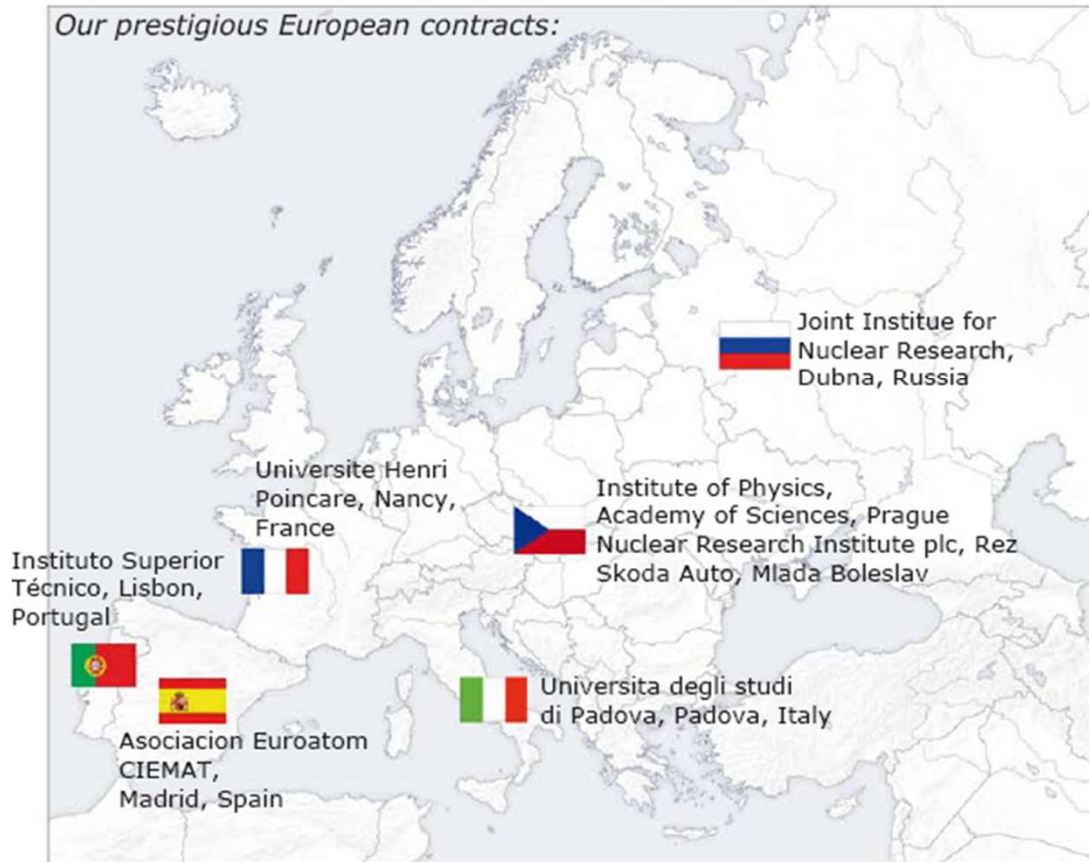


References



Joy of Technology

Our prestigious European contracts:



Agenda

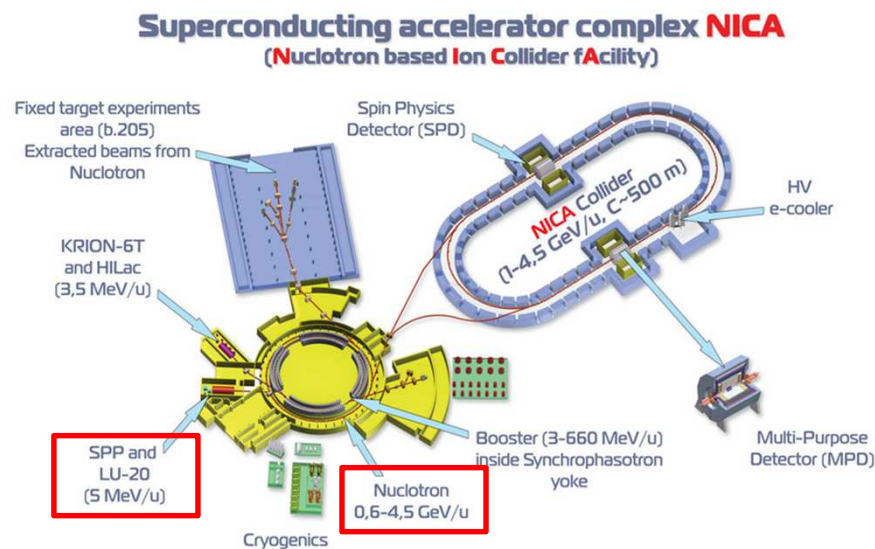
TOPICS:

Company profile



LU-20 Vacuum Control System

❑ Vacuum Control System for Linear Accelerator at JINR in Dubna, Russia



❑ Linac Control system scale

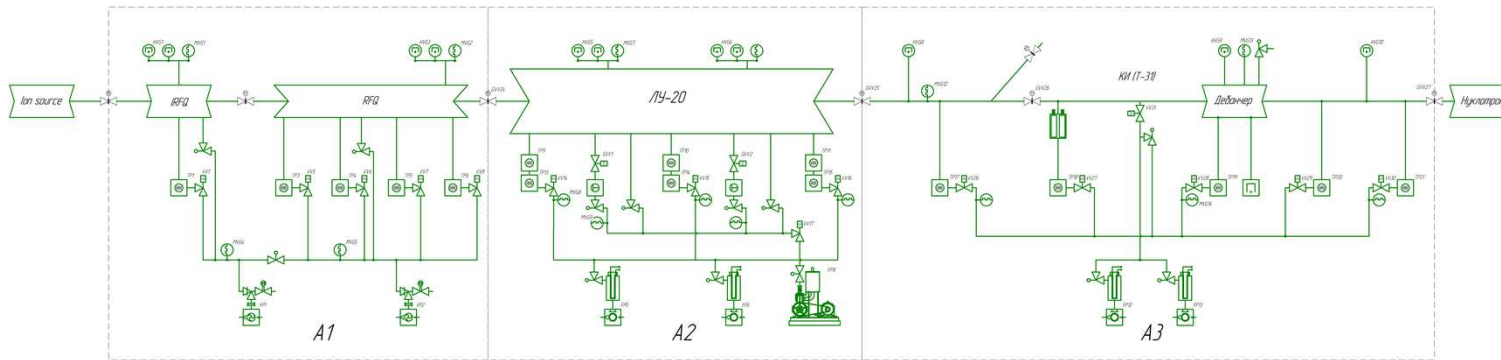
- 6 primary vacuum pumps
- 16 turbo-molecular pumps
- 40 valves
- vacuum gauges

❑ Nuclotron Control system

- 10 primary vacuum pumps
- 18 turbo-molecular pumps
- 9 ion pumps
- 40 valves
- HV PSU for lone pumps

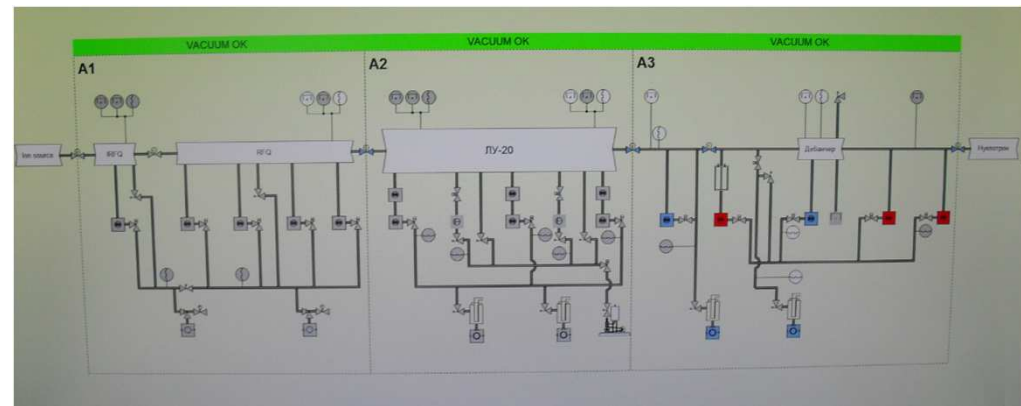
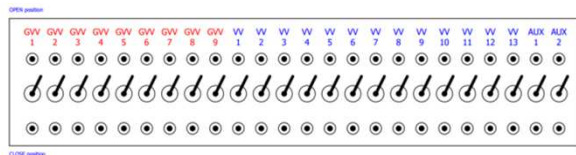
ASU2 Vacuum Control System

Two control regime desired



Local control

Remote control with additional control logic



Control System Specification

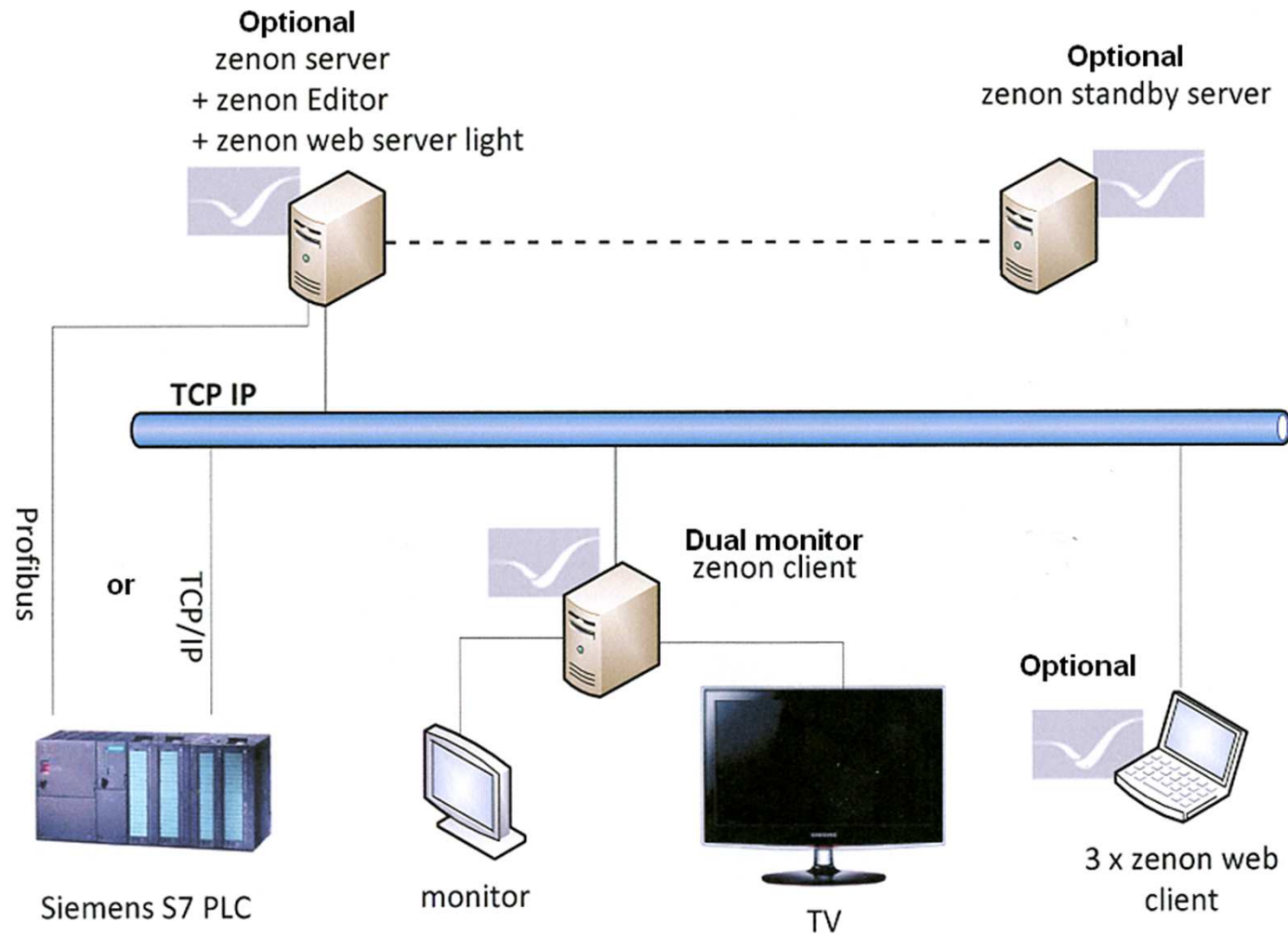
□ Main control system features

- System based on the robust **PLC controller and Profi Bus DP** communication
- **Zenon Supervisor** based control and presentation
- **TCP/IP** communication standard
- Flexible routing of partial information to **external clients**
- Storage of all **parameters to PC**
- **Backup Server** extension possible



ref. 1

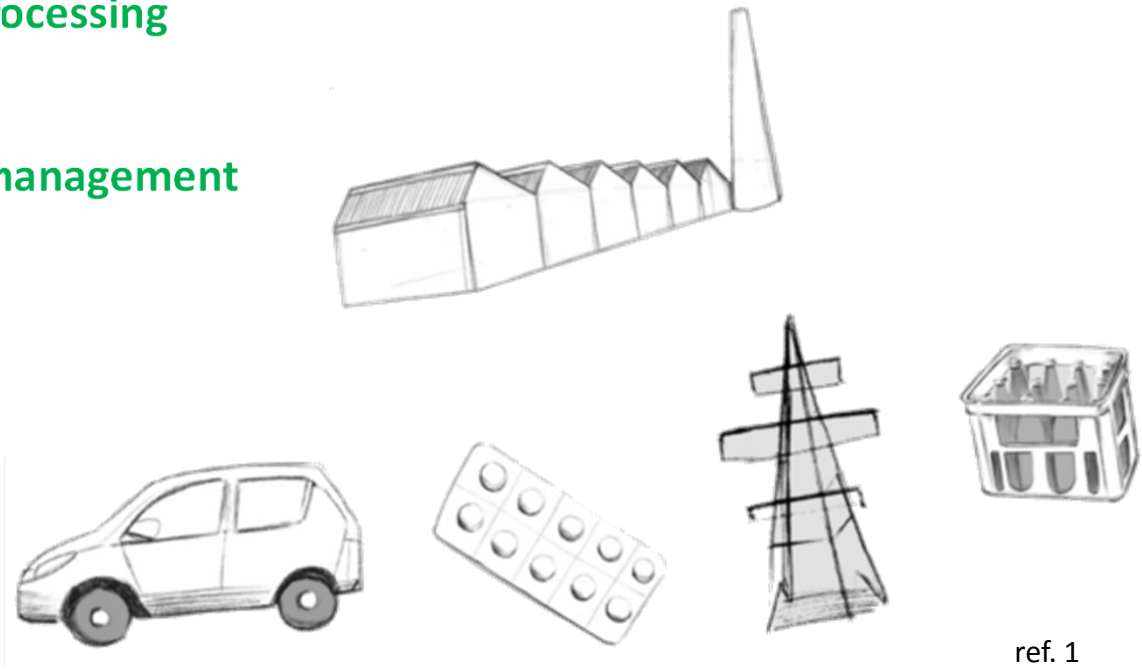
Zenon Based Concept



Zenon Supervisor Features

□ Proven solution in many different industries

- Simple presentation of graphs, tables, trends etc.
- Alarms handling
- History of alarms, warnings and operator action
- Advanced graphics processing
- Simple data export
- Simple archive data management



ref. 1

On Site Work

❑ Hardware realization



Agenda

TOPICS:

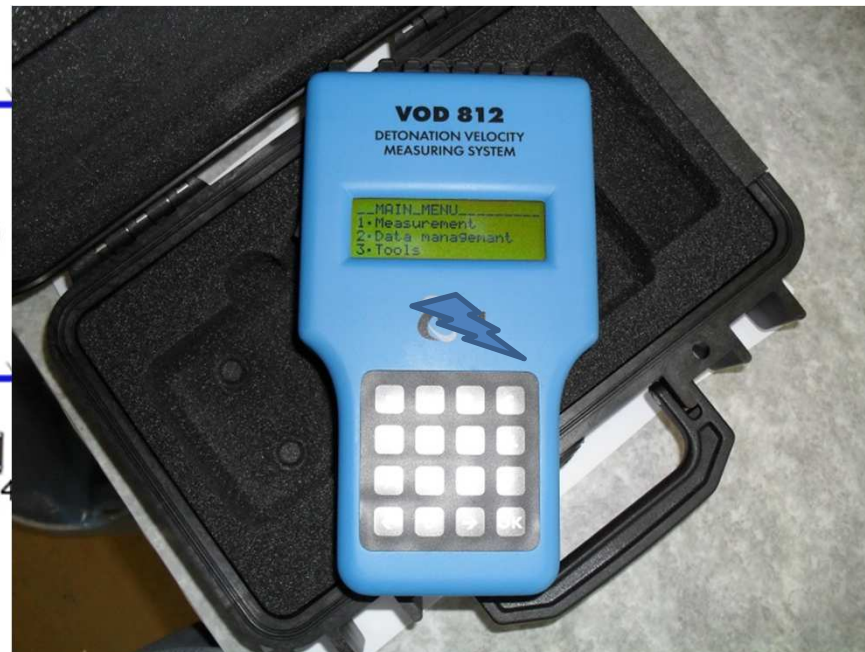
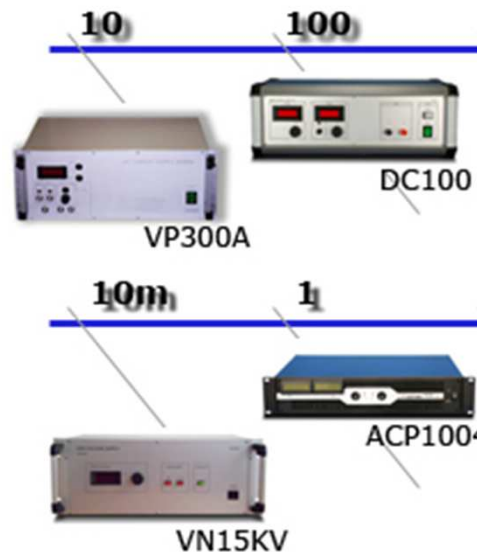
- Company profile
- Vacuum Control Systems



Power Supplies Range

□ DC – AC – waveform – programmable

➤ up to 500 A, peak power up to 40 kW



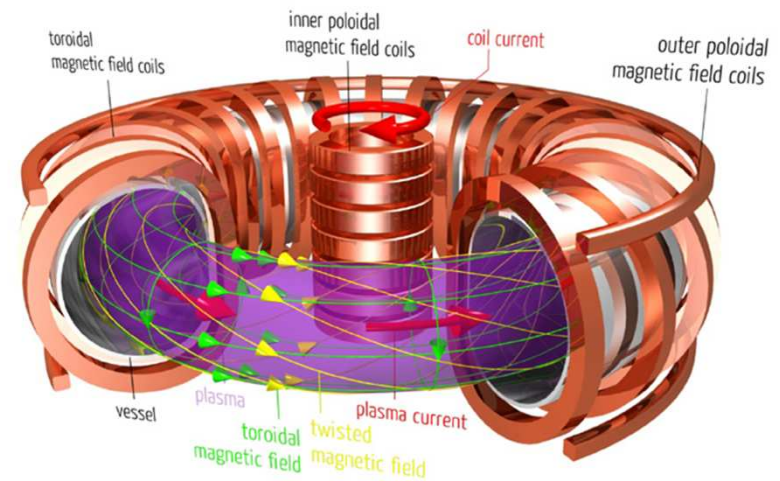
Power Supplies Examples



Agenda

TOPICS:

- Company profile
- Vacuum Control Systems
- Customized Power Supplies

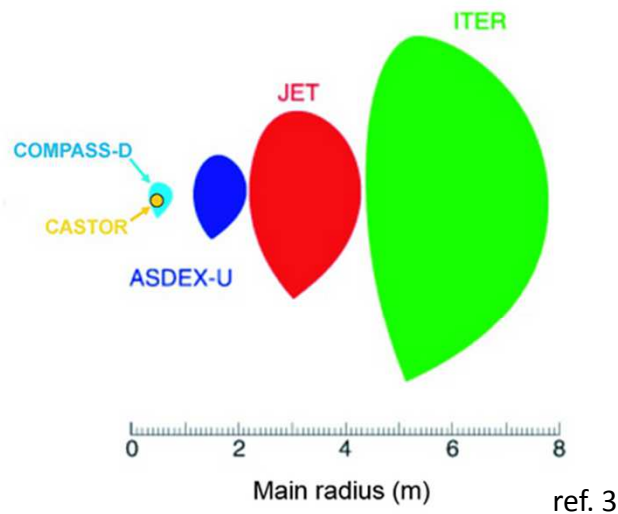


ref. 2

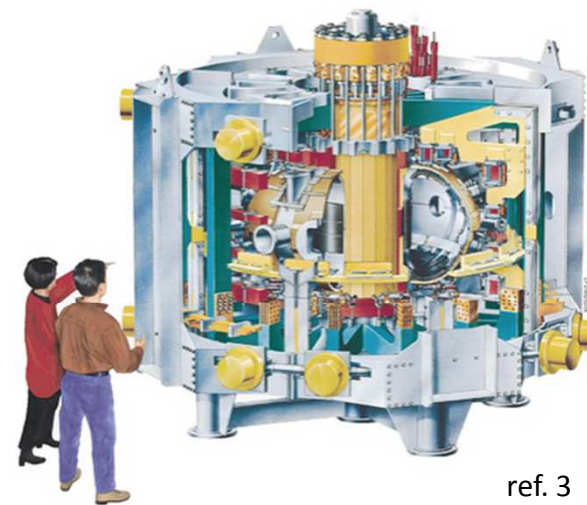
COMPASS – COMPact ASSEMBly

□ Tokamak COMPASS in the Institute of Plasma Physics AS CR

- **experimental facility**
- **represents a reference operation for the ITER tokamak**



Scale of European tokamaks with cross-section similar to ITER



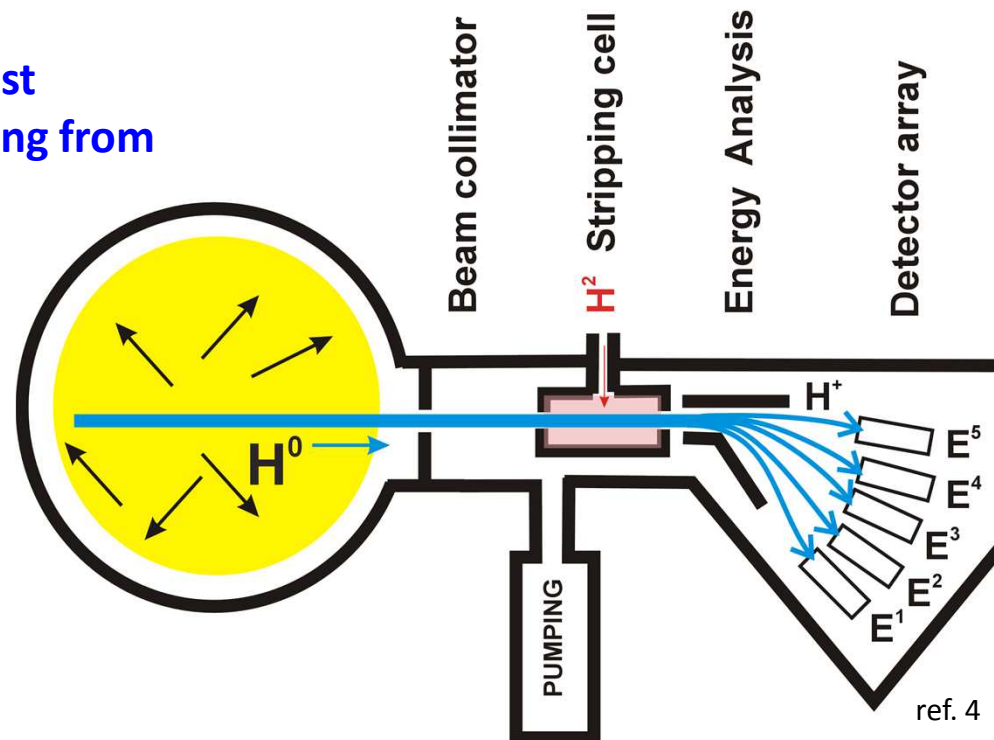
Cutaway diagram of tokamak COMPASS

Principle of Measurement

☐ Measurements of ion temperature and fast ions spectra

- neutral atoms (hydrogen, deuterium) escaping COMPASS plasma
- Their en. distribution function is related to the en. distribution of plasma ions

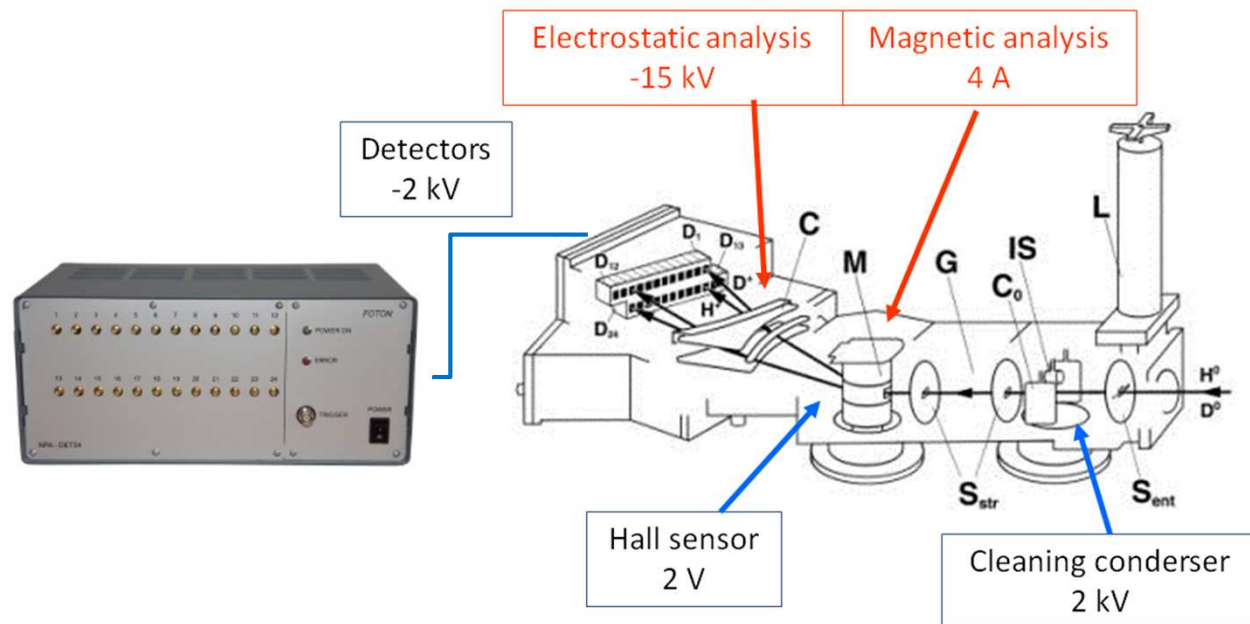
Energy analyser of fast neutral atoms escaping from tokamak



NPA on COMPASS

☐ Measurements of ion temperature and fast ions spectra

- **Multiple Power Supplies** required
- **Neutral Particle Analyser**

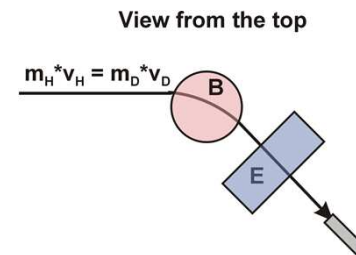


ref. 4

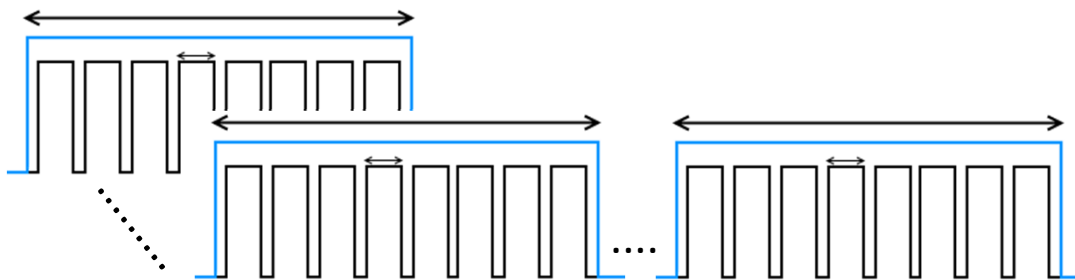
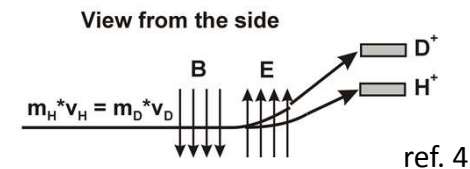
NPA in Numbers

☐ Measurements of ion temperature and fast ions spectra

- 24 channels analyser
- 50us to 1ms window duration
- 16ns pulse duration
- 10k of windows
- PC communication



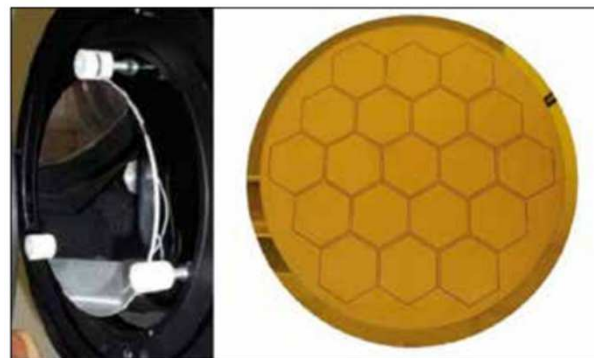
12 ch for hydrogen atoms,
12 ch for deuterium atoms
measured simultaneously!



Agenda

TOPICS:

- Company profile
- Vacuum Control Systems
- Customized Power Supplies
- Plasma Diagnostic



ref. 5

Prague Asterix Laser System

❑ PALS laboratory in Prague

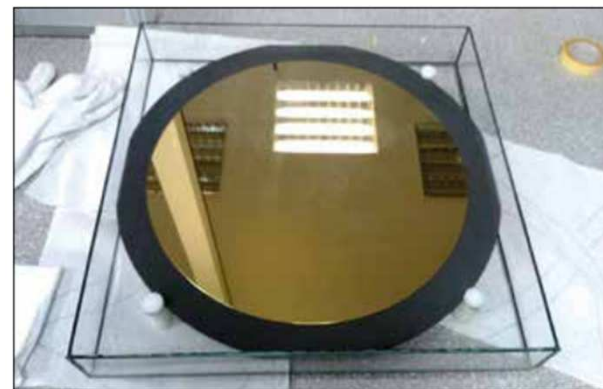
- Asterix IV, 1.315 μm
- 350ps, 3TW

❑ Bimorph structure with a composite core

- Up to 300 mm diameter
- High power lasers
- Lightweight
- Up to 128 actuators



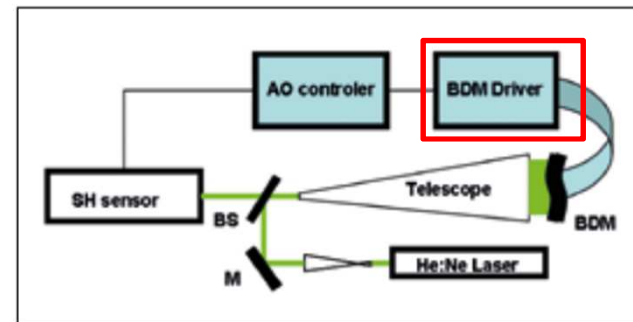
ref. 5



PiezoDriver in Numbers

□ Deformable mirror driver

- 64 channels driver
- 10-250V output voltage
- $\pm 0,1V$ output voltage
- 12bit output resolution
- PC communication



ref. 5

References

□ List of references

- Ref: 1,2 <http://www.copadata.com/en/products/zenon-supervisor.html>
- Ref: 3 <http://en.wikipedia.org/wiki/Tokamak>
- Ref: 4 Passive measurement of Ti on COMPASS by NPA – J.Stockel, A.Melnik, M.Petrov
- Ref: 5 Vývoj velkopřůměrové kompozitní adaptivní optiky V. KMETÍK, B. VÍTOVEC



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