JINR *60

JINR + VACUUM

JINR + VAKUUM PRAHA

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VAKUUM PRAHA

- 60 years - JINR
- 30 years - VP people cooperate with JINR
- 23 years - VP delivers to JINR

JINR … prestigious international accelerator research facility, founded on the 26th March 1956 (Czechoslovakia one of founders), demanding, challenging and reliable partner.

VP … supplier of sophisticated vacuum systems and components to

- CERN
- JINR
- Universities and high-tech companies in Switzerland, Germany, Czech Republic, Slovakia, Austria, France, Canada, Israel, Croatia, Sweden, Poland, Spain and other countries.

VP … cooperates with Czech hi-tec companies at JINR

FOTON STREICHER VAKUUM SERVIS

23 years cooperation of VP with JINR

History:

- 1980-90 first contacts, seminars, IGP and QMS for LNeP
- 1990-2000 IGP for nuclotron, injection channels U400, U400M
- 2000-10 FLNR DRIBS, DC60 (Astana), DC72 (Bratislava)
- 2010- SASE DLNP-DESY, LHEP Nuclotron upgrade, DC280 FLNR

Motivation:

- improving vacuum parameters in existing JINR systems
- manufacturing of new vacuum systems with better parameters

Results:

- the ultimate pressure in VP upgraded vacuum systems for JINR has been lowered by two orders of magnitude generally
- the ultimate pressure in new systems and beamlines … UHV
- the hydrocarbon content in VP systems … very low

Outcome:

- ✓ VAKUUM PRAHA … supplier of sophisticated high vacuum and ultrahigh vacuum systems to JINR

Technology

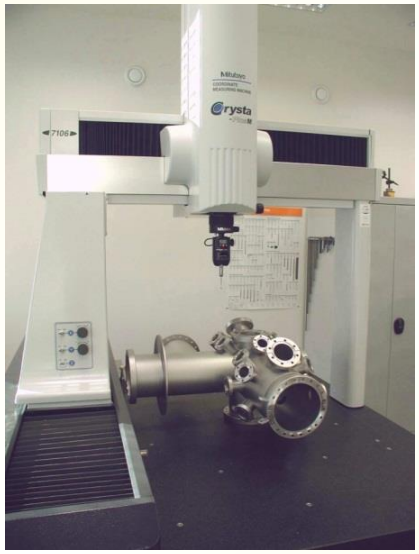
- Machining
- Mechanical quality control
- Welding (argon arc, electron beam)
- Chemical cleaning for UHV/XHV
- Thermal vacuum processing

Machining

	Manufacturing of stainless steel UHV/XHV components and systems
1	check-in of the material
2	vacuum firing of material if necessary
3	mechanical production and inspection of single details
4	chemical cleaning, washing and drying
5	welding of single parts and subassemblies
6	vacuum testing - leak detection
7	machining of the welded parts and subassemblies
8	mechanical inspection of the welded parts and subassemblies
9	vacuum testing - leak detection
10	vacuum baking of the welded parts and subassemblies
11	vacuum testing - leak detection

Technology

Electron beam welding



Quality Management

Chemical cleaning

	Manufacturing of stainless steel UHV/XHV components and systems - cont.
12	assembly of the vacuum system (subsystem)
13	mechanical inspection of the assembly
14	visual inspection of the assembly - sealing edges, surfaces
15	chemical cleaning, washing and drying
16	wet glass ball blasting of the assembly
17	chemical cleaning, washing and drying
18	vacuum testing - leak detection
19	vacuum baking of the assembly
20	vacuum testing - leak detection
21	final visual inspection of the assembly
22	wrapping and protecting against moisture and mechanical damages
23	dispatching

Vacuum chambers and subsystems

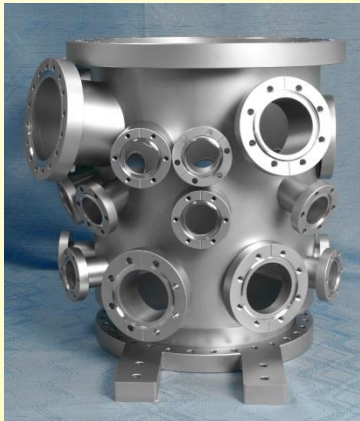
Uni. of British Columbia
Vancouver, Canada

Sincrotrone Elettra,
Terst, Italy

Umeå University,
Sweden

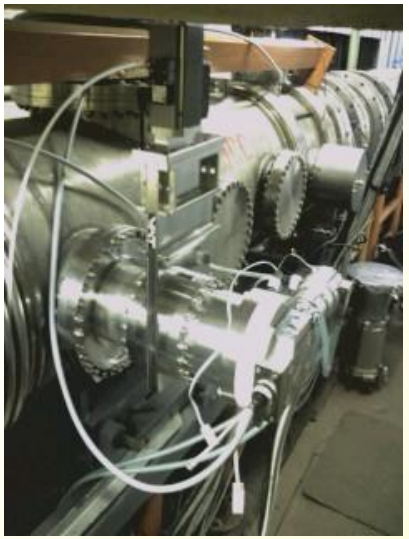
Tectra, Frankfurt, Germany

Ferrovac
Zürich,
Suisse



Upgraded Nuclotron vacuum system

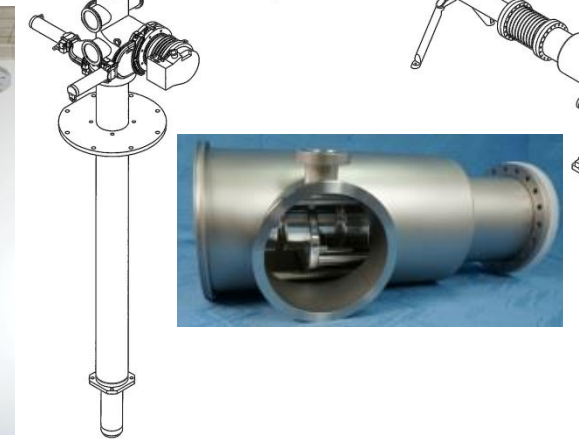
Cooperation of VAKUUM PRAHA + FOTON

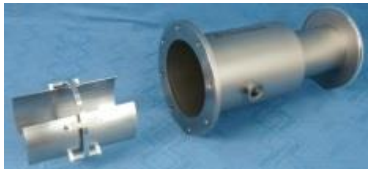


NICA

Cooperation of STREICHER + VP

DC 280 – Injection Channel



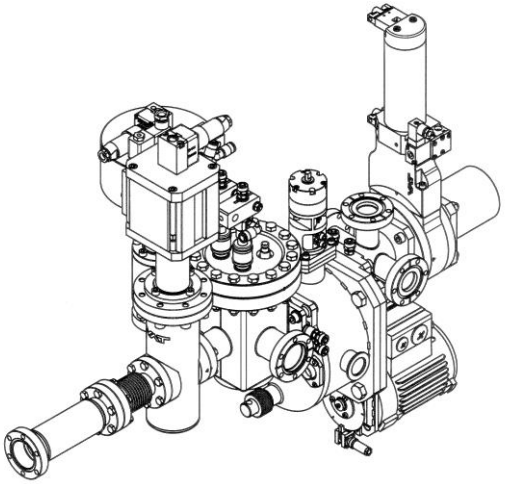


All components manufactured in VP according to UHV standards

Industrial cooperation VP- JINR: BETA Factory Dubna

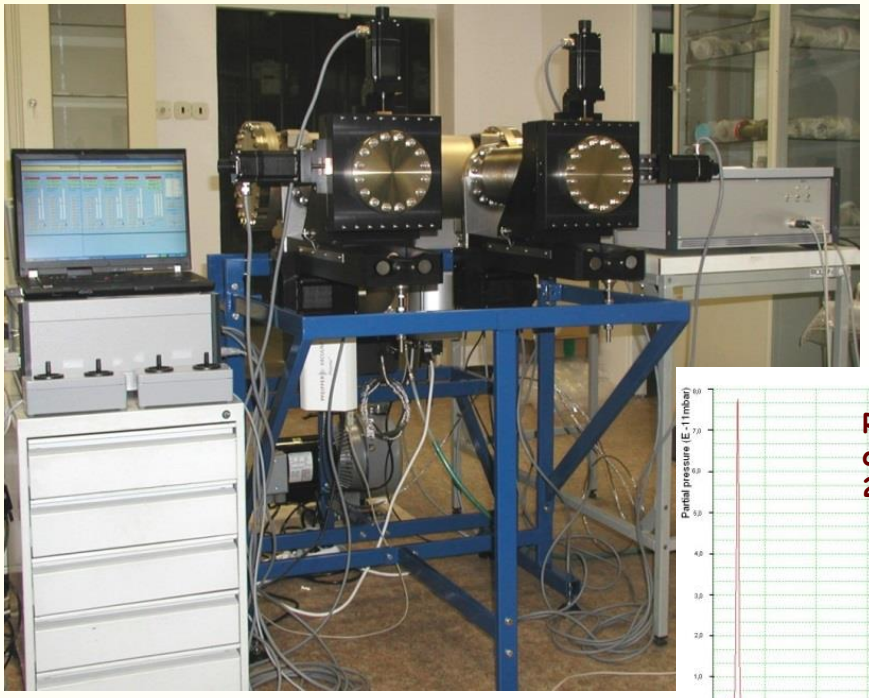
MASHA – Mass Analyzer of Supper Heavy Atoms

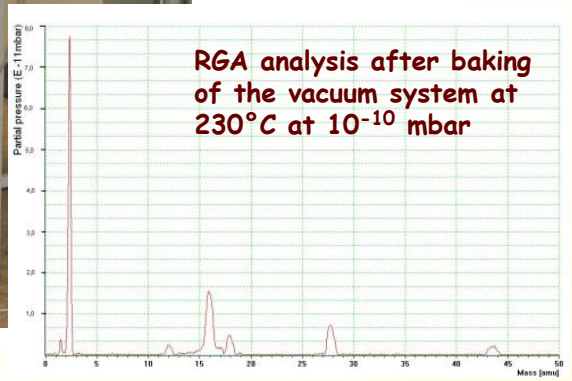
dedicated
for separation and mass analysis of ions of superheavy elements



Hot trap with rotating target of MASHA separator

Vacuum system for XFEL - DESY
SASE MCP-based photon detector





European XFEL

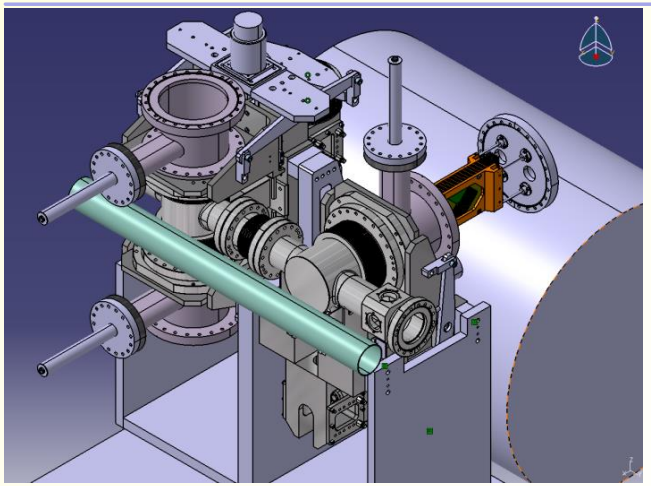
Cooperation with JINR in DESY Hamburg

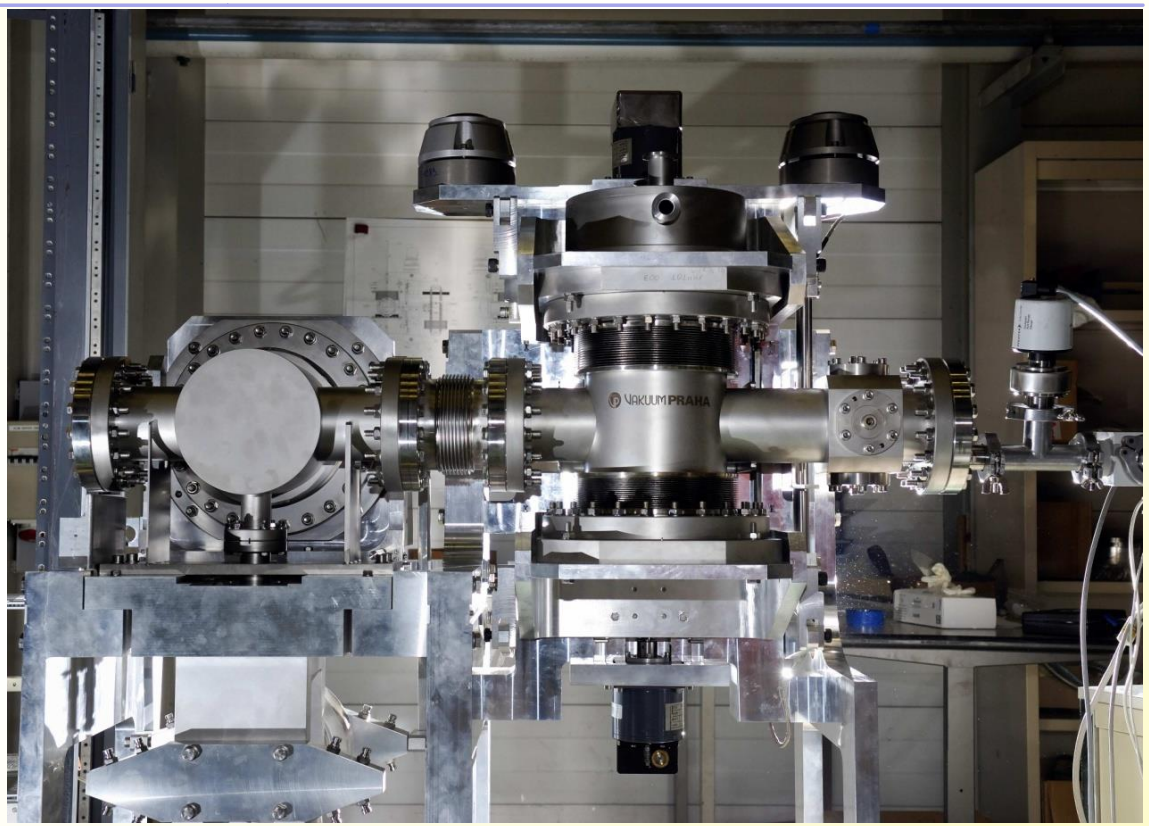
Vacuum systems for XFEL radiation photon beam diagnostics (study and optimization of the free electron laser creating the self amplified spontaneous emission)

Vacuum systems for SASE-1, SASE-2 and SASE-3 delivered to DESY Hamburg in a close cooperation with Prof. Syresin

Another examples of cooperation VAKUUM PRAHA - JINR in third countries: Bratislava – Slovakia, Astana – Kazakhstan, Vinča - Serbia

Forward Proton Detectors-Roman Pots CERN – LHC (TOTEM, ATLAS)





RPs: detection of forward protons from elastic or diffractive scattering (5 μrad)

- **mounted in the LHC ring in the outcoming beam**
- **detectors: inside RPs**

RP stations located symmetrically around the CMS (project TOTEM) and ATLAS interaction points at distances ~200 m from the interaction point

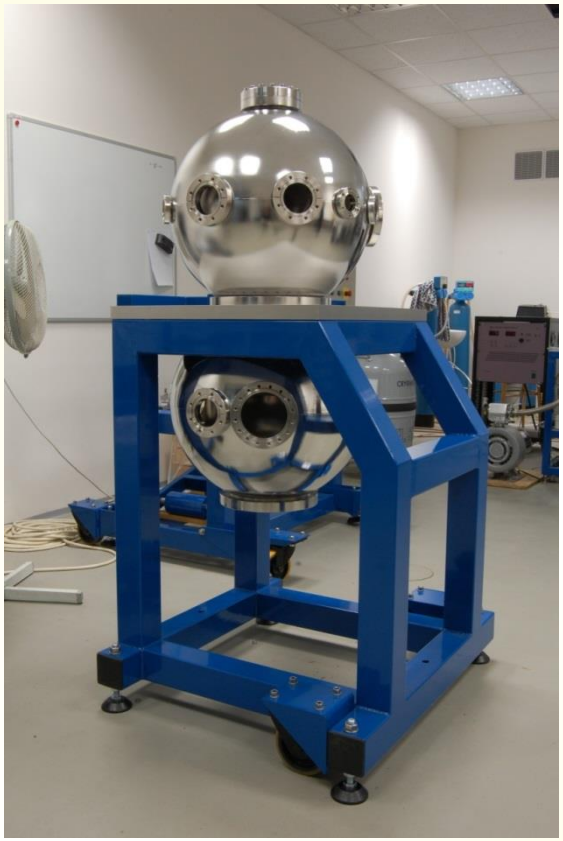
Vacuum systems for AMS

Accelerator Mass Spectrometer – Radiocarbon Dating

ETH + Ionplus Zürich

UHV/XHV Calibration System

UHV stage orifice flow standard



XHV stage dynamic extension

- range 10^{-1} to 10^{-6} Pa
- spherical chambers $\phi = 500$ mm
- stainless steel, electropolished
- tandem turbopumping

- beryllium copper low outgassing rate 10^{-13} Pa m/s
- ultimate pressure 10^{-11} Pa

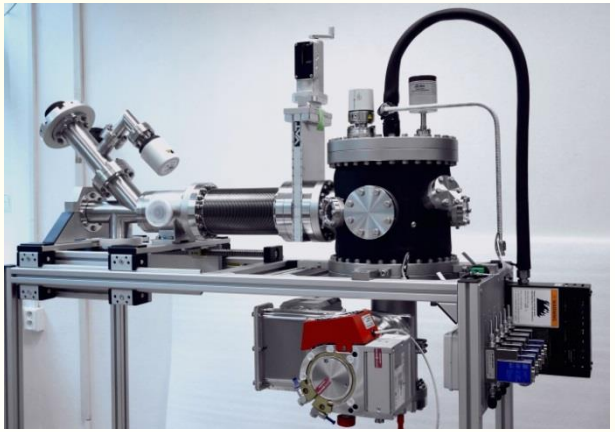
Sophisticated vacuum scientific instruments

UHV sputtering deposition system
Uni. Pilsen

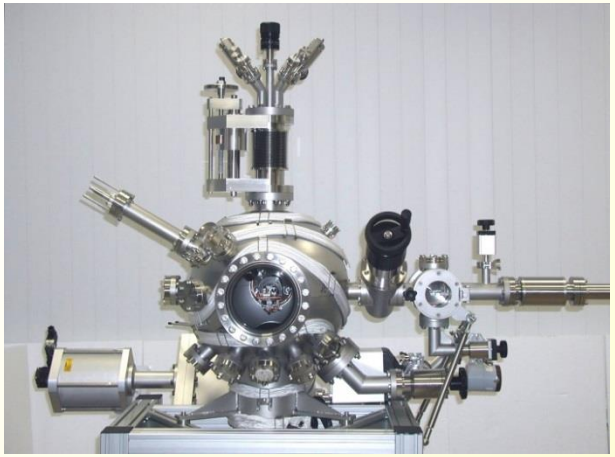
Solid State electrotransport system
Charles Uni. Prague
Toyama Prefect. Uni., Japan

EU infrastructure projects in Czech Rep.

UHV system for cold emission studies
Technical Uni. Brno



PECVD system
Technical Uni. Brno



UHV sputtering deposition system
Charles Uni. Prague

Vacuum oven for crystal growth
Charles Uni. Prague

Поздравляем !  Blahopřejeme !

Congratulations!

You are always welcome

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Thank you for your attention !