ACCEL Instruments GmbH

Advanced Technology Equipment and Turn-Key System Supplier for Research, Industry and Medical worldwide

ACCEL-Site in the Technologiepark Bergisch Gladbach (BAB A4)

Business Units

RF Components and Systems
Linear Accelerators
Specialized Manufacturing Projects

Superconducting Magnet Systems
Circular Accelerators
Proton/Ion Therapy

Synchrotron-Beamlines
X-Ray Systems
Special UHV Equipment

ACCEL Sites

[Bergisch Gladbach (9000 m²)]

Administration, Marketing/Sales, Management, Engineering, Manufacturing, Assembly, Testing,

[Troisdorf (5500 m²)]

Series Production of the Superconducting Main Quad Magnets

[Glarus/Schweiz (300 m²)]

Mechanical Machining, Sales

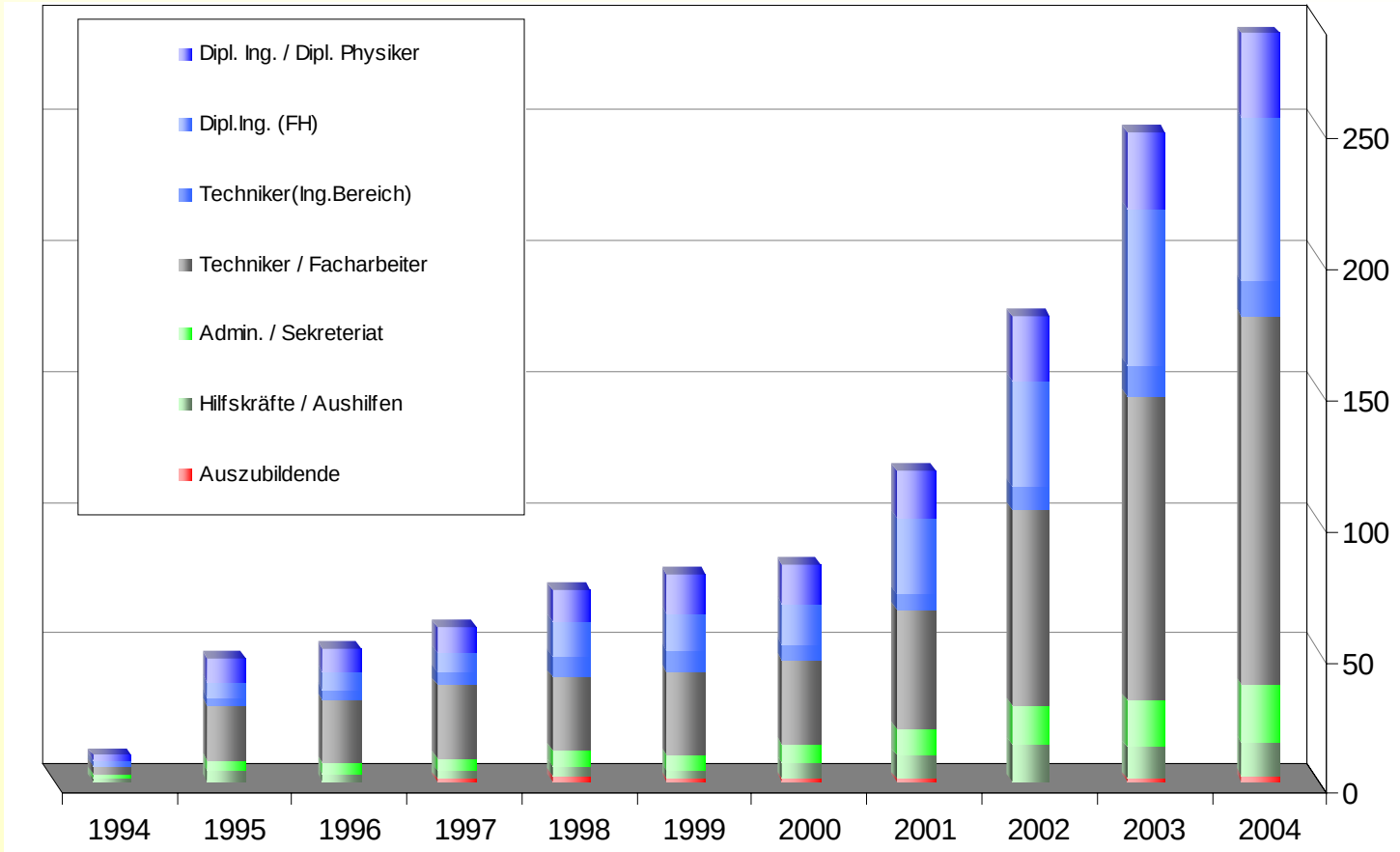
ACCEL Instruments GmbH

1980 - 1993	Siemens AG/Interatom GmbH in Bergisch Gladbach „Accelerator and Magnet Technology“
1993/94	Foundation of ACCEL Instruments GmbH, Management Buyout Contract with Siemens AG Production Facilities, Rights, Documentation Regulation Transfer, Guarantees, etc. Transfer of about 30 existing Key People
End of 2004	Staff of 270 People Physicists, Engineers, Manufacturing Specialists, Commercial, Controlling, Administration

More than 2000 Person Years of accumulated KnowHow and

above 400 Mio € of Business Volume since 1980

ACCEL Personnel



An Advanced Technology Engineering and Manufacturing Company

ACCEL – Core Competences and Markets

Certified by DIN EN ISO 9001:2000, DIN EN 13485:2003, KTA and further norms

Technologies

- ✔ RF
- ✔ Magnets
- ✔ Superconductivity / Cryogenics
- ✔ Vacuum
- ✔ Optics
- ✔ Specialized Manufacturing
- ✔ Integr. System Control

Products / Services

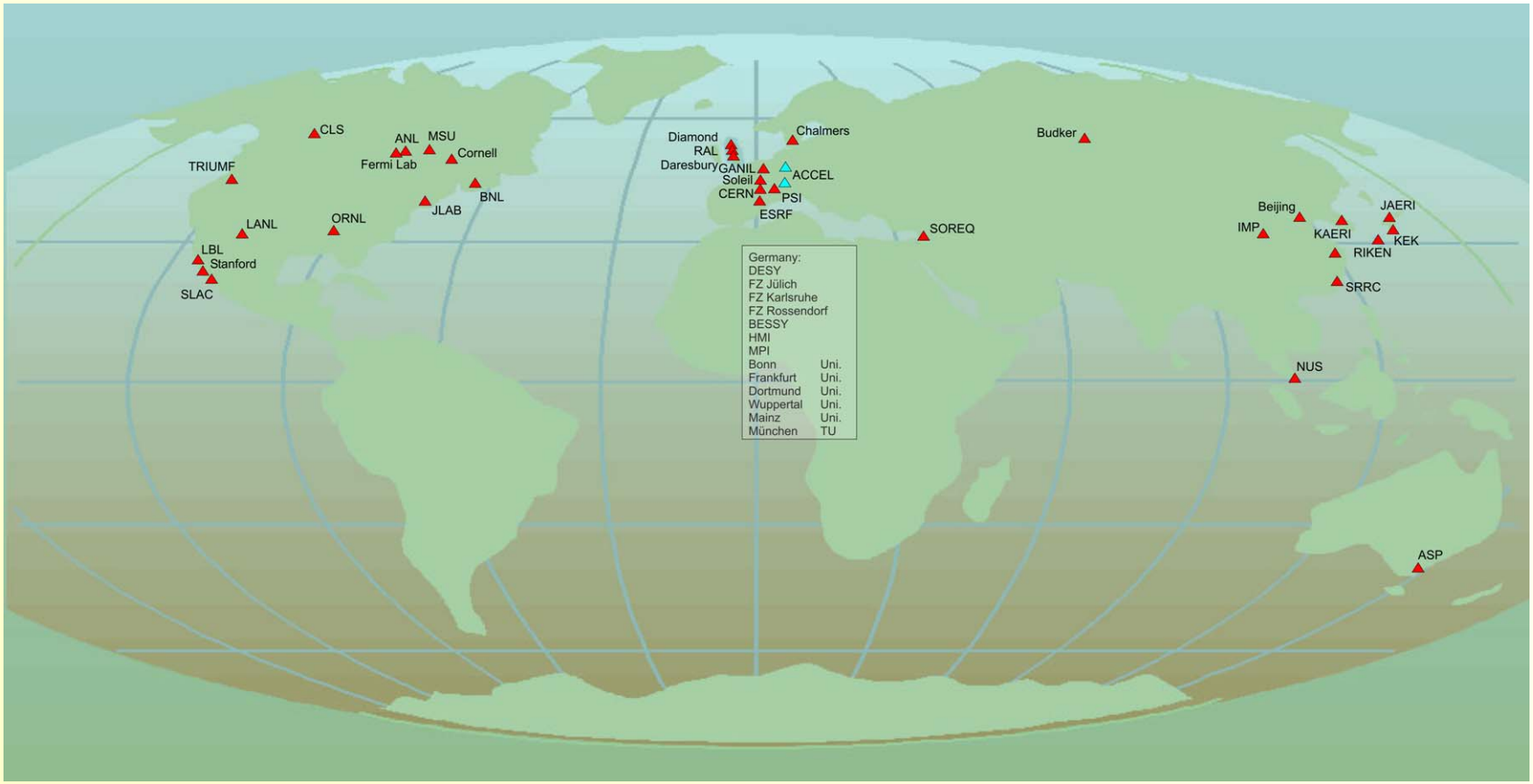
- ☛ Lin. & Circ. Accelerators
- ☛ RF Cavities / SRF Modules
- ☛ S.C. Magnet Systems
- ☛ Beamlines, Insertion Devices
- ☛ Vacuum & Cryog. Systems
- ☛ International Project and Quality Management

Markets

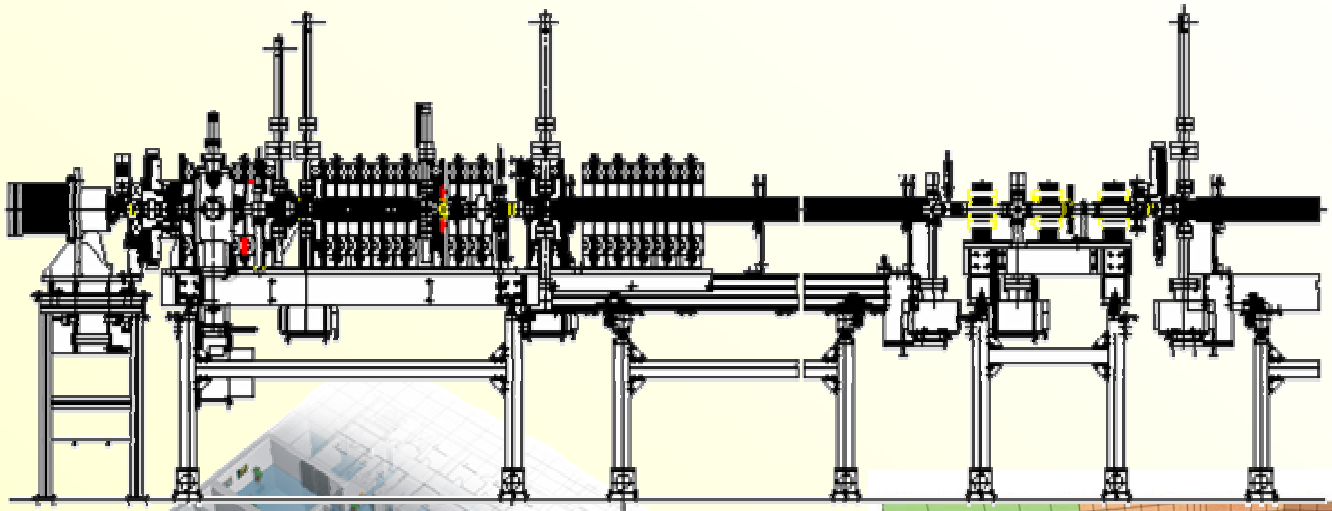
- Fundamental & Applied Research
- Medical/ Particle Therapy
- Energy/ Nuclear
- Advanced Technology Industry

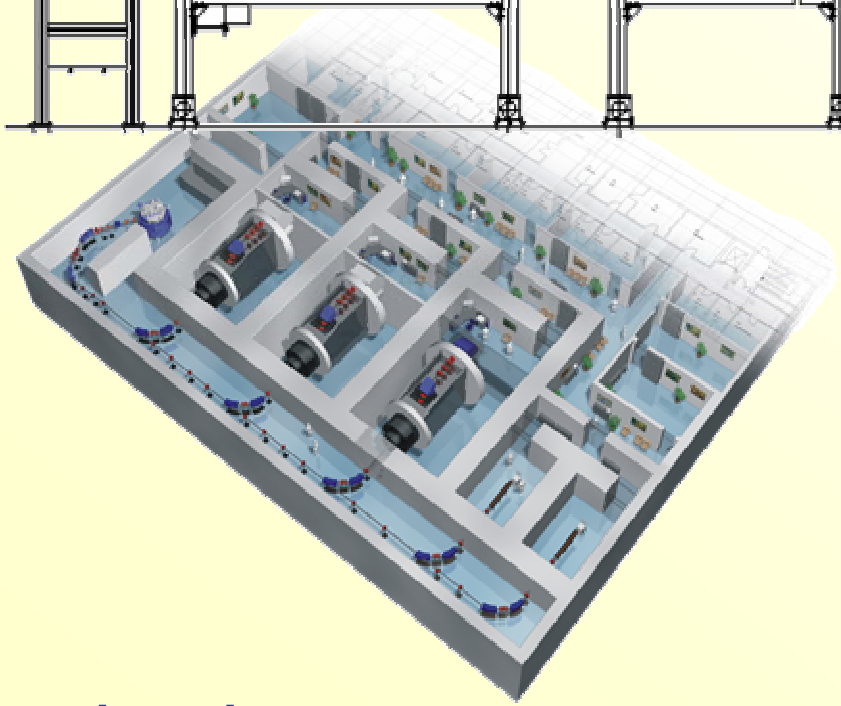
physics layout – engineering – design – manufacturing – assembly – testing - service

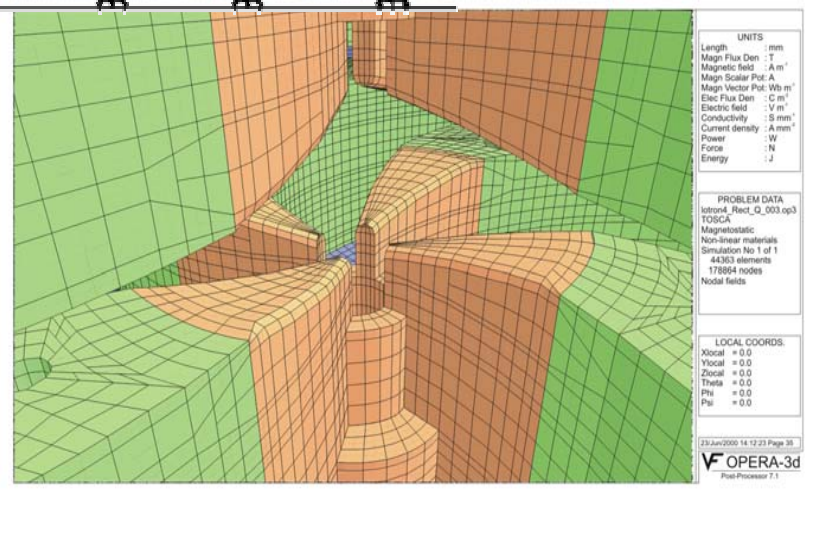
World Map of Customers and Partners in Fundamental and Applied Research (not complete)



ACCEL





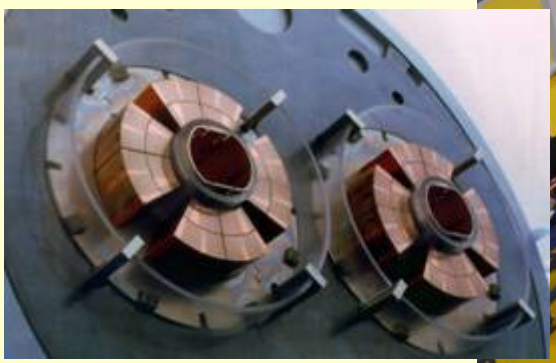


Engineering <> Manufacturing <> Series Production <> System Integration

ACCEL

Engineering <> **Manufacturing** <> Series Production <> System Integration

ACCEL



Engineering <> Manufacturing <> **Series Production**<> System Integration

ACCEL

Engineering <> Manufacturing <> Series Production <> **System Integration**

Production of Superconducting Niobium Cavities

ACCEL manufactured e.g. 360 CEBAF, 109 SNS and about 50 TESLA Cavities as a Special Equipment Supplier (Technology Transfer DESY, JLAB, Cornell, Wpt. Univ.)

2 TESLA Cavities with guaranteed Performance for BESSY

Preparation steps	Done at
Manufacturing	ACCEL
100 µm BCP (closed loop)	ACCEL
Heat treatment 800 °C	DESY
20 µm BCP (closed loop)	ACCEL
High pressure rinsing (HPR)	ACCEL
Assembly in cleanroom	ACCEL
Transport under vacuum	ACCEL
Vertical test	DESY

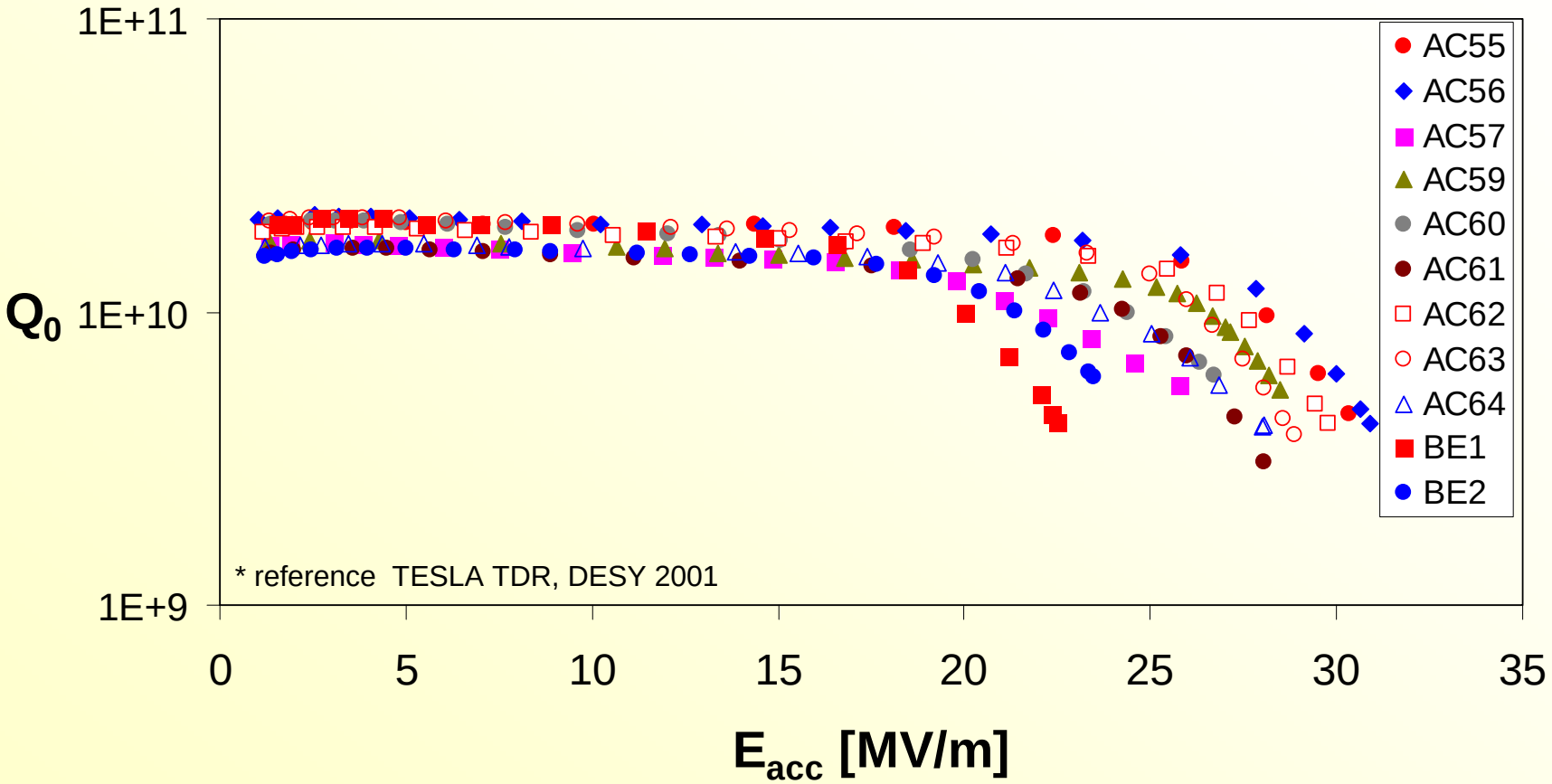
For Future Projects:

All steps under responsibility of ACCEL with using existing DESY inspection, furnace and test infrastructure

HPR at ACCEL

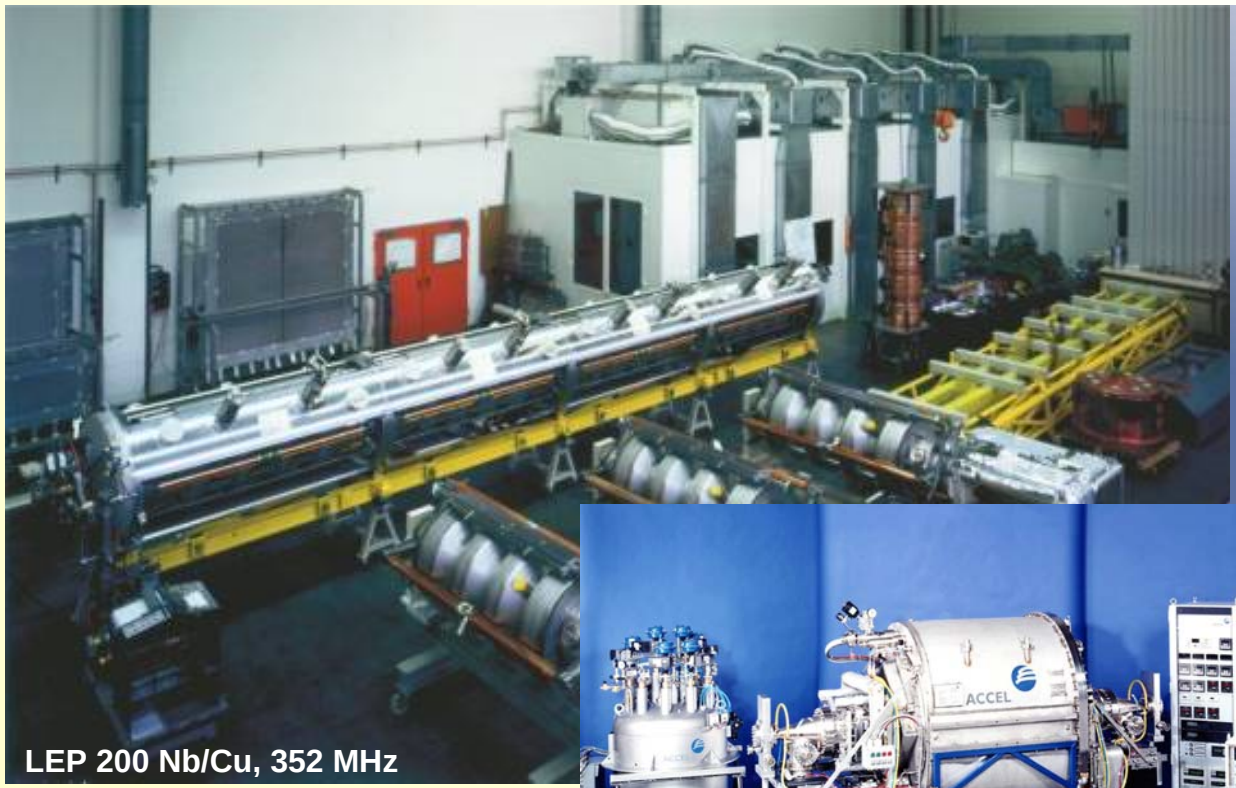
Test at DESY

TESLA Cavities for BESSY and DESY*



AC cavities for DESY (prepared by DESY): heat treated at 800 C and 1400 C (except AC63)
BE cavities for BESSY (prepared by ACCEL): only heat treated at 800 C

Superconducting RF Accelerator Modules (Examples)



LEP 200 Nb/Cu, 352 MHz

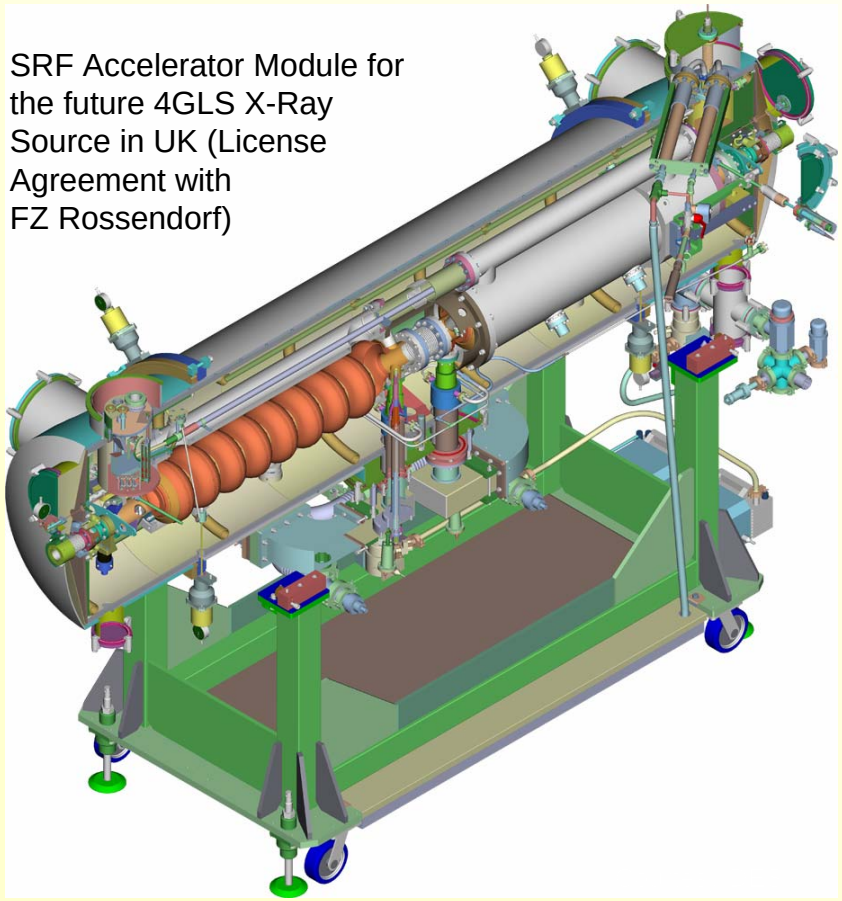
Cornell Type 500 MHz Single Cell SRF Module for Cornell, NSRRC, CLS, DLS

3rd harmonic, 1500 MHz Landau Module for BESSY (Inhouse Development)

Technology Transfer from CERN and Cornell

Superconducting Linear Accelerators for FEL/ERL Applications and the Future ILC

SRF Accelerator Module for the future 4GLS X-Ray Source in UK (License Agreement with FZ Rossendorf)



SRF Cavities and Modules for the future projects X-FEL/DESY (1000 Units) in Hamburg und ILC (20000 Units)

ACCEL is the World leading Company in SRF Technology

CCL Modules for SNS in Oak Ridge/USA

Complete CCL-Module during RF Test at ACCEL

CCL Linac at SNS

ACCEL manufactured, assembled, aligned and rf tuned 4 CCL Modules as a Special Equipment Supplier (Co-operation with LANL)

Turn-Key S-Band Electron Linear Accelerators for Synchrotron Light Sources and Medical Applications

SLS/PSI, CH

Delivered:

SLS/PSI, CH	100	MeV

In Production:

DLS, UK	100	MeV
ASP, Australia	100	MeV
PTB, Germany	0,5-50	MeV

Technology Transfer from DESY (Dortmund Univ.)

License Agreement on S-Band Lin. Collider Components with DESY

Turn-Key 40 MeV Proton/Deuteron SRF Linac for SARAF/Israel

Parameter for p / d	Value	Unit
Energy maximal	40	MeV
Energy minimal	5	MeV
Energy adjustment accuracy	200	keV/step
Current maximal (cw)	2 (4)	mA
Current minimal (cw)	40	μA
Transv. emittance (norm. rms)	< 1	π*mm*mrad
Longit. emittance (rms)	< 4	π*nsec*keV/n
Operation	6000	hours/year
Reliability	90	%

3 Phases:

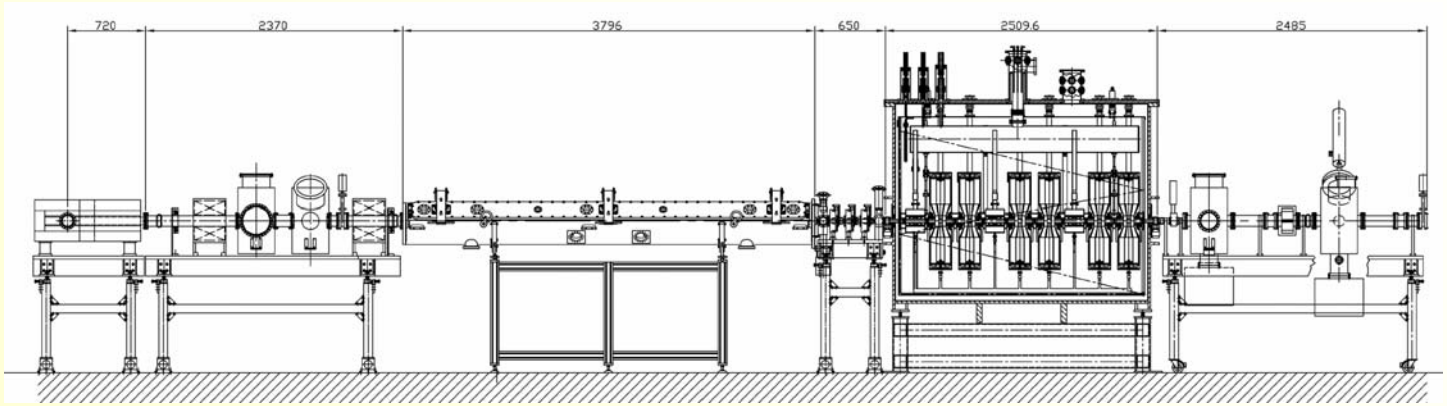
Assessment and Design Study (incl. Beam Dynamics Simul. and Error Analysis)

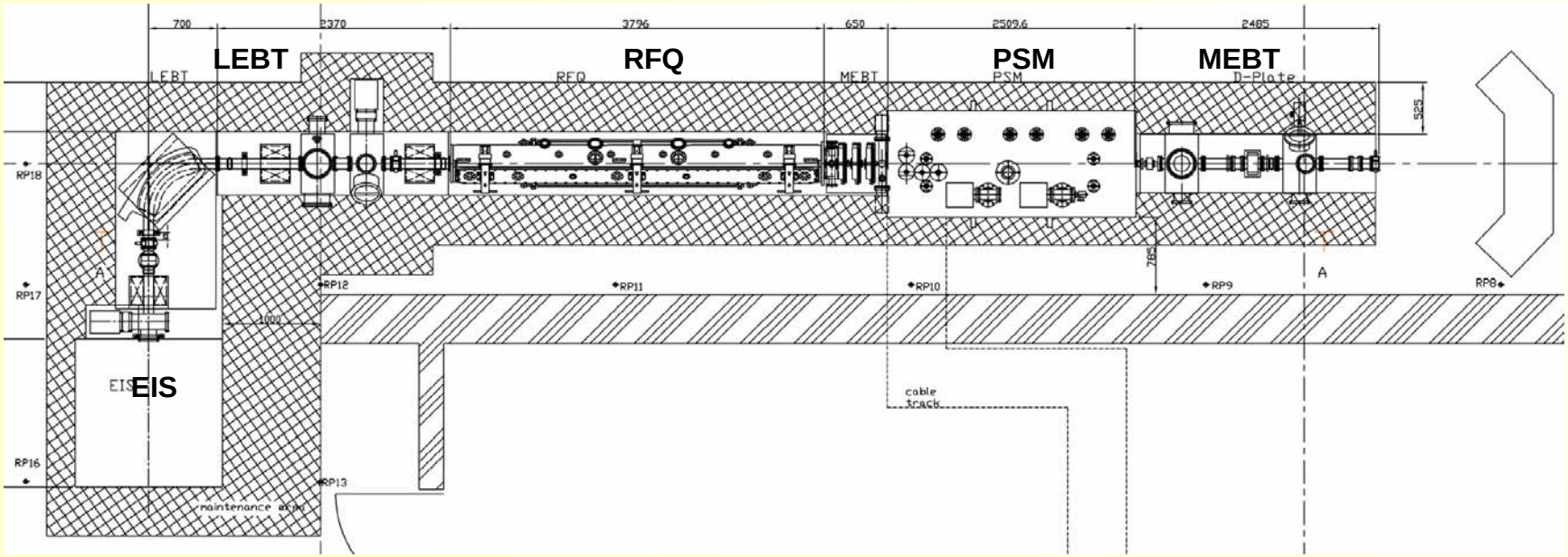
Design-Build-Install. Linac Injector with Prototype SRF-HWR Module (incl. Infrastructure Requirements)

Upgrade to 40 MeV

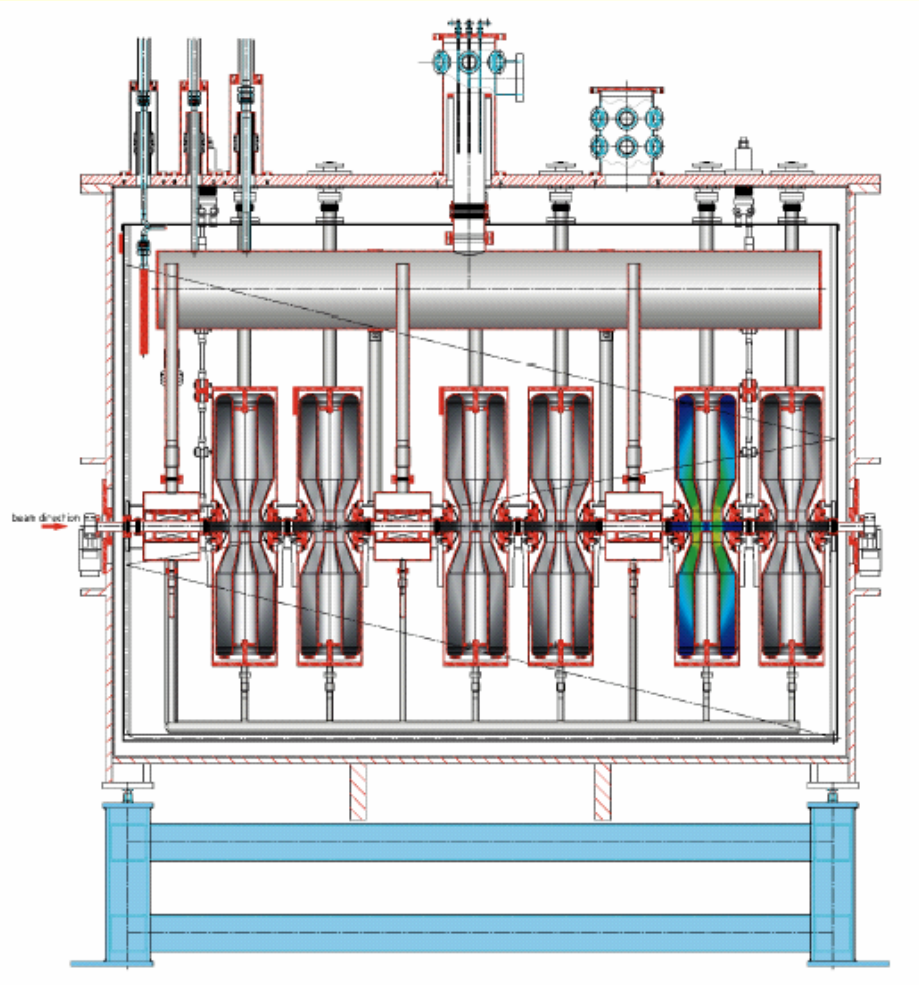
Intense Inhouse R&D, strong Interaction with World's leading Accelerator Labs (e.g., INFN LNL, ANL, MSU, Frankfurt Univ., FZJ, LANL, ORNL, PSI, AECL)

SARAF p/d Injection Linac



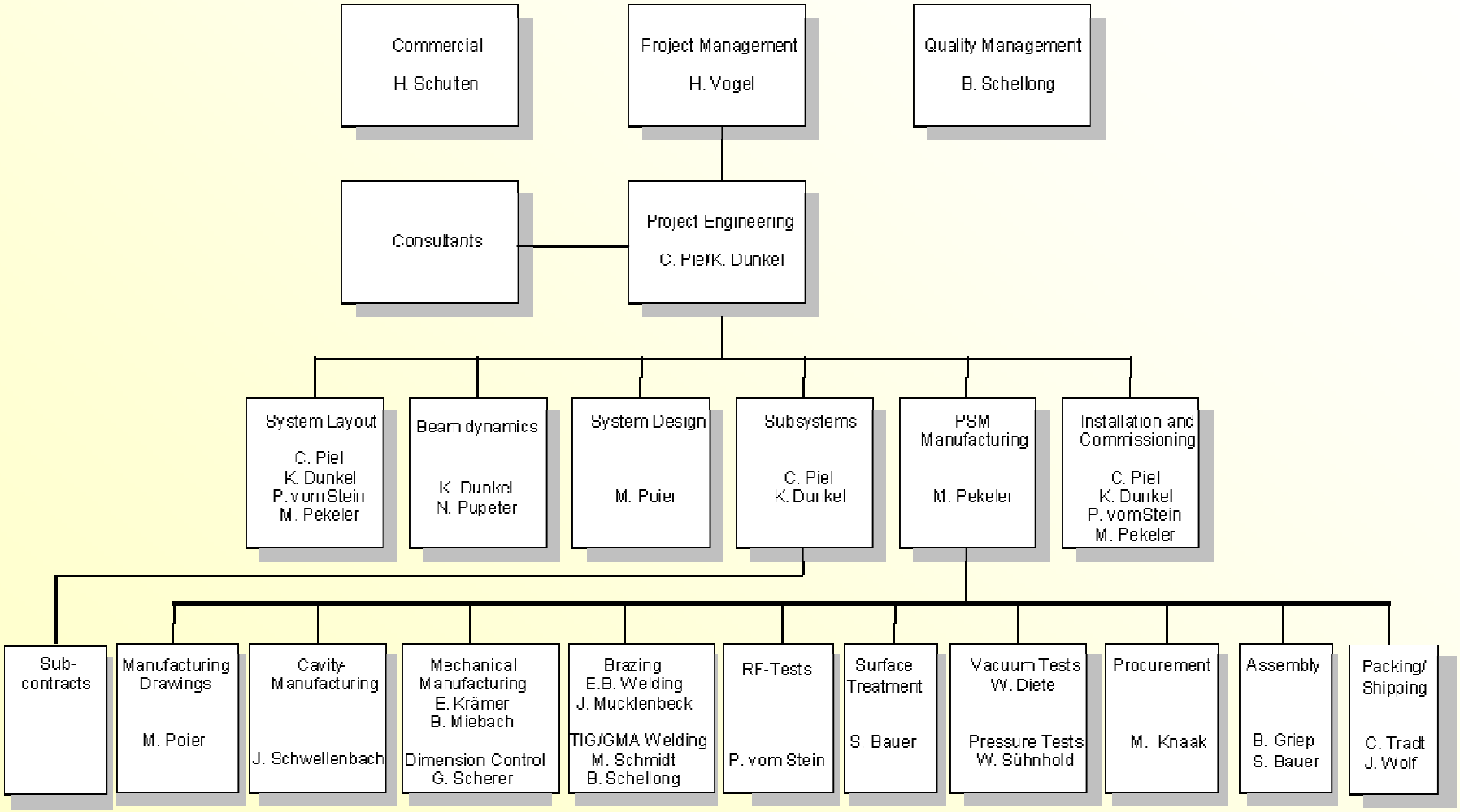


Prototype Superconducting HWR Module for SARAF

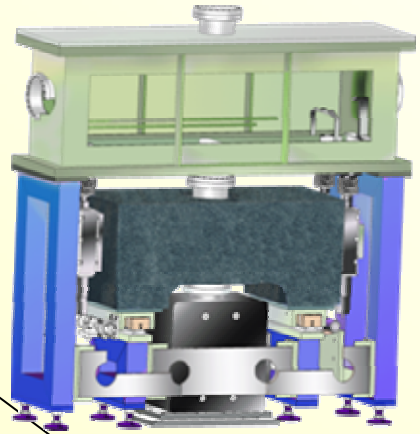


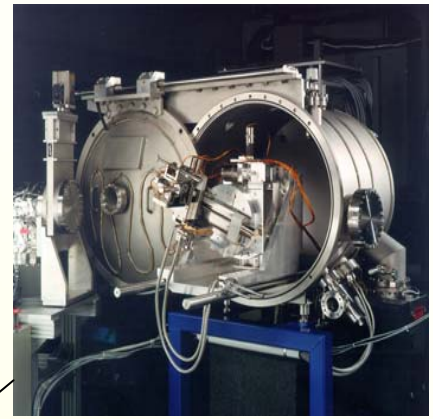
- **Acceleration of protons and deuterons from 1.5 MeV/u on**
- **Cavity vacuum and insulation vacuum separated**

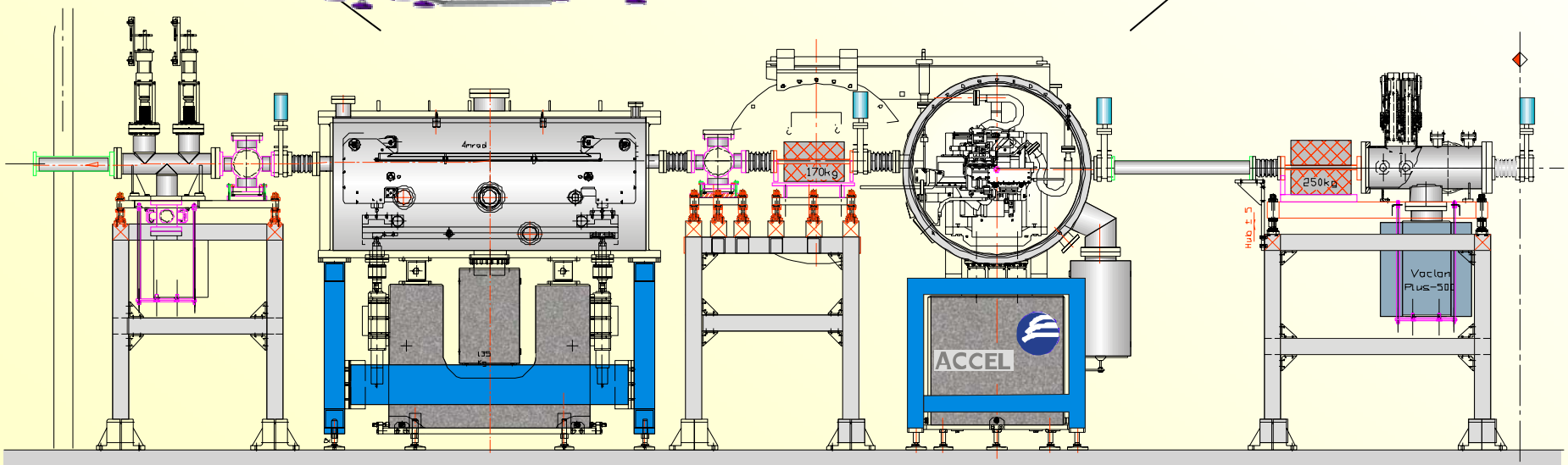
ACCEL Project Team for SARAF



X-Ray Beamline for Protein-Cristallography at the Canadian Synchrotron Light Source CLS







Precision Reflectometer for Charakterisation of Optical Lens Systems for the EUV-Semiconductor Lithography (PTB/Berlin)

The Characterisation of Extreme Ultra Violett (EUV) Lens Systems is performed by this High Precision Reflectometer working under Ultra High Vacuum Conditions

Superconducting Magnet Systems

Superconducting Magnet Energy Storage for the Stabilisation of a Laboratory Current Supply

Superconducting Magnets are Key Components for Nuclear Fusion Plants

(ITER/TFMC, Consortium AGAN (ACCEL, Alstom, Ansaldo, Noell)

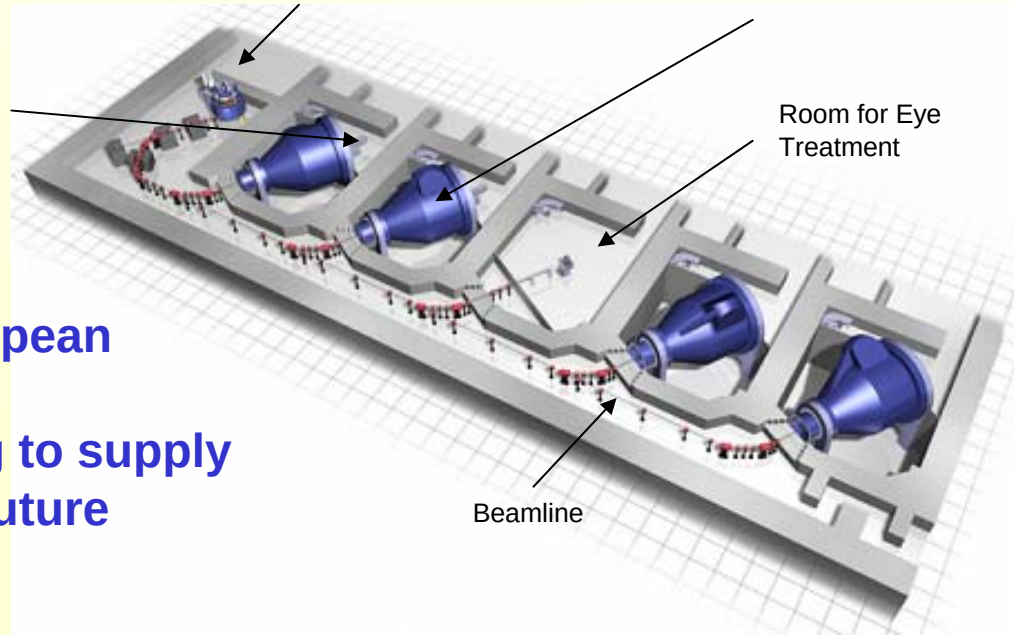
Superconducting Magnet Systems for Research

Proton Therapy Facilities

Treatment Room

Superconducting Cyclotron

Rotating Gantry



ACCEL is delivering the first European Clinical Proton Therapy Facility (RPTC/München) and is expecting to supply more such Facilities in the near Future

ACCEL Instruments GmbH

- Advanced Technologies, Turnkey Systems
- Engineering and Manufacturing
- Integrated System Control, Software
- Highly motivated, qualified people
- Project oriented, integrative, flexibel
- Worldwide Business
- intensive, fruitful and multinational Cooperations

We would be happy to serve with all our Management, Engineering and Manufacturing Capabilities and Know-How for the most exciting Accelerator Projects worldwide… and for the Future International Linear Collider