

# HZDR Innovation GmbH - Enhanced industrial access to large R&D- infrastructures



**ERF-Workshop "Technology Transfer and Industrial Relations in Research Infrastructures"**

**7<sup>th</sup> June 2013, Triest**

**Dr. Björn Wolf, head of technology transfer and legal affairs**

**HZDR  
INNOVATION**

**HZDR**

**HELMHOLTZ  
ZENTRUM DRESDEN  
ROSSENDORF**

# The Helmholtz-Zentrum Dresden-Rossendorf

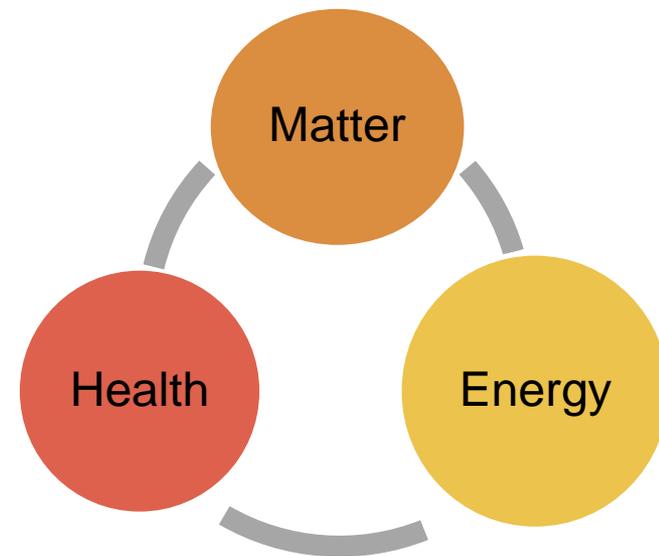
**Member of** Helmholtz Association of German Research Centers (since 01/2011)

**Employees** 1,000 from 45 nations, 300 scientists

**Budget** ~ 100 Mio. Euro (20% third party funding)

**Research** at eight institutes, in three research fields, and  
**with** five large-scale facilities

**Research Sites** Dresden, Freiberg, Leipzig, Grenoble



# Research Questions and Large-Scale Facilities

## Health

How can malignant tumors be more precisely visualized, characterized, and more effectively treated?

## Matter

How do matter and materials behave under the influence of strong fields and in small dimensions?

## Energy

How can energy and resources be utilized in an efficient, safe, and environmentally-sound way?

PET Center

ELBE – Center for High-Power Radiation Sources

Dresden High Magnetic Field Laboratory (HLD)

Ion Beam Center (IBC)

TOPFLOW Facility

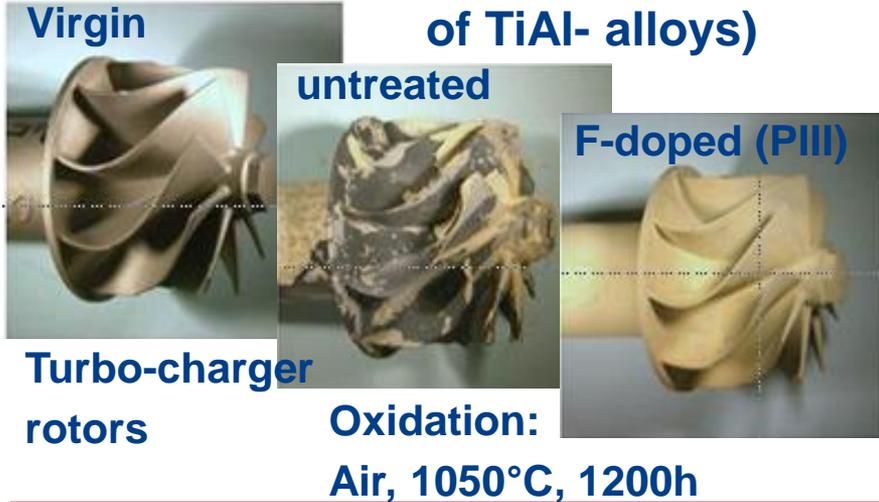
blue: LK II facility



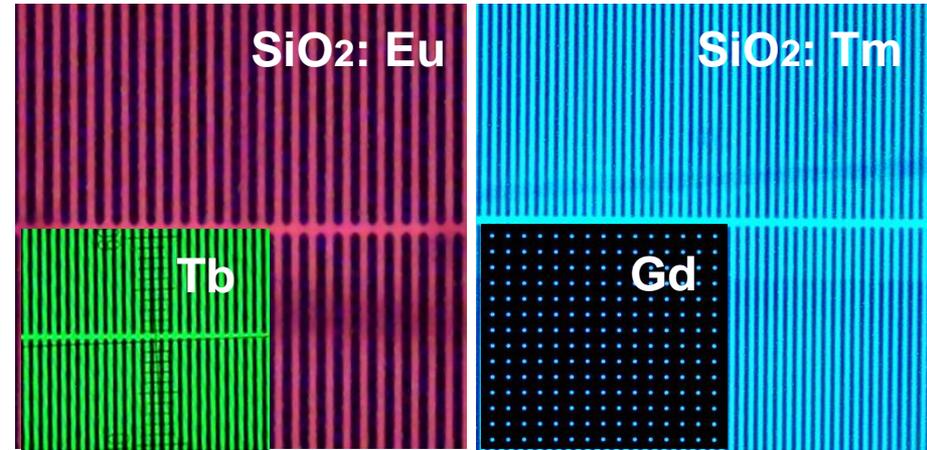


# Ions – Universal Tool for Surface Modification

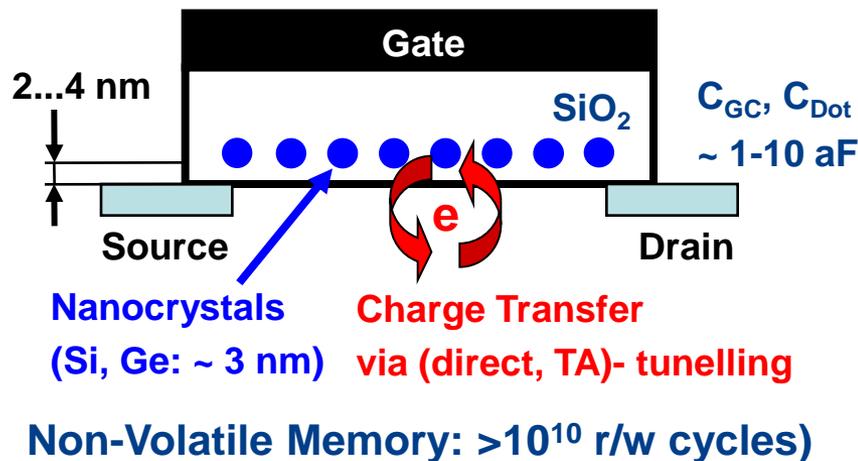
## Mechanics (→ Corrosion Resistance of TiAl- alloys)



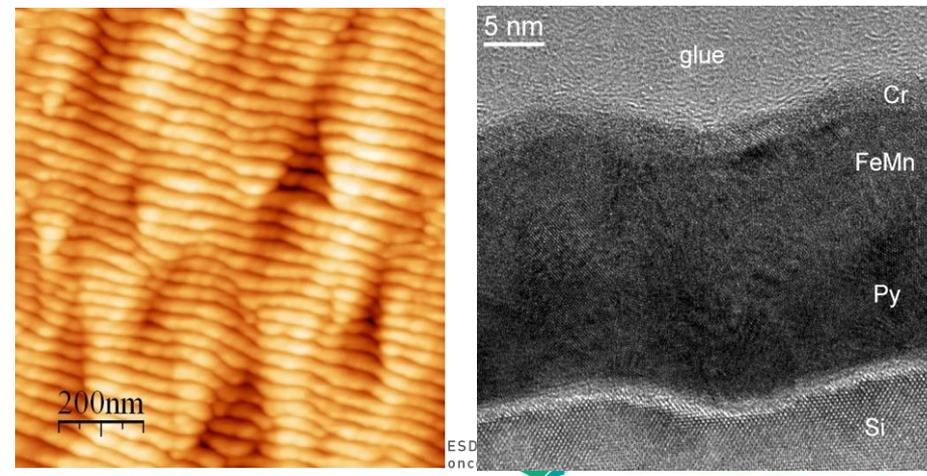
## Optics (→ Si- based Optoelectronics)



## Microelectronics (→ NC-Memory)



## Magnetics (→ Magnetic Anisotropy)



# Plasma immersion ion implantation - Tools and Applications at the HZDR

## Doping of Semiconductors

P Doping of Si PV Wafers  
B Doping of Si PV Wafers

## Bio Materials

Nanoporous Metal Surfaces  
Tribological Protecting Coatings  
Antibacterial & biocompatible Surfaces

## Super Hard Coatings

Cubic Boron Nitride  
Titanium Nitride

Tool	Application
PBII-3	Implantation
PBII-5	Implantation and deposition
PBII-6	Deposition of cBN
PBII-7	Implantation of F
PBII-8	Implantation and deposition
PBII-9	Doping of semiconductors

## High Temperature Oxidation Protection of TiAl -Alloys



Turbine blades



Automotive valves



Drug eluting stents & nanoporous membrane



# High-Energy Ion Implantation for Power Electronics

## Power Devices:

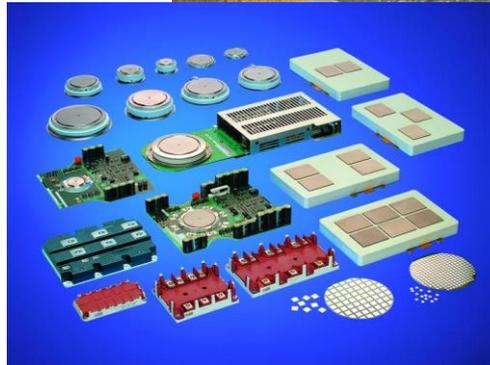
- Power Diodes, MOSFET's, IGBT's ect.
- Voltage: ~ kV, Current: A... kA

## Benefits, e.g.

- Switching speed increase
- Power-loss reduction

## Applications:

- Power Converter
- AC/DC Drives
- Traction Control Units
- Generator Electronics



# State of the art - High-Energy Ion Implantation at HZDR

- ✓ Two modern MeV accelerators → Internal “2<sup>nd</sup> source”
- ✓ High expertise in ion implantation, semiconductor research
- ✓ Long-term experiences of scientists and technicians
- ✓ Big pool of radiation protection licenses on the campus
- ✓ Developable plot on the HZDR campus
- ✓ first clients at HZDR
- ✓ No up to date HE ion beam services worldwide
- ✓ logistic advantage of combined Ion / electron irradiation

## Further growing market of HE ion implantation

- ✓ Worldwide climate protection, need of decreasing CO<sub>2</sub> emission & more electromobility result in necessity of decreasing power loss in electronics  
→ requires low power loss devices



# Our motivation to found the HZDR Innovation GmbH

1. Extension of industrial request for ion implantation production service
  - Problems: conflicts with main task, non profit status, liability & professional management of industrial orders
2. Intention to strengthen the technology transfer
  - How to finance the valley of death (prototypes, demonstrators)?
  - How to incubate and develop new businesses?
  - How to manage shares of our spin offs?
  - Problems: organisational and financial restrictions

## alternatives:

- **A.** leave it alone (reject orders; no incubation)
- **B.** create a new suitable structure
  - = found a commercial arm and outsourcing of production

# Goals with the HZDR Innovation GmbH

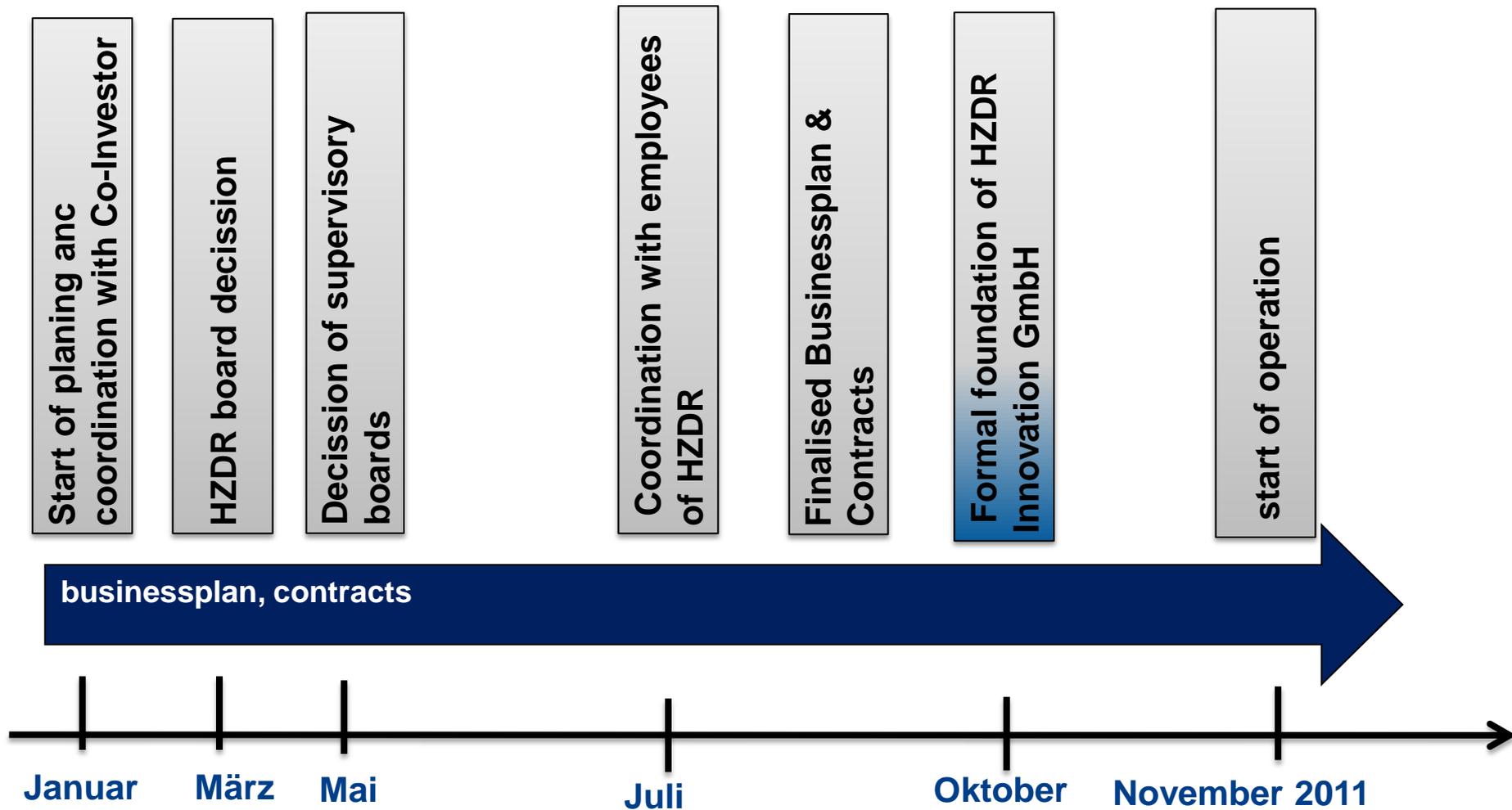
- HZDR e. V. concentrates on main task excellent research
- At the same time: take the market chance and strengten the technology transfer
- Legal certainty (non profit, liability) and transparency
- Professional management of industrial orders (TQM, payment termes, insurance, duty....)
- Personal and financial flexibility
  - Accumulation of profits for later investments at HZDR
  - Job perspectives for employees of HZDR
  - Motivation for top performers
  - Funds for validation, incubation, shares
- Independant active sales group

# Legal and organisational aspects

- Corporation with limited liability (GmbH)
- HZDR holds 24,9 % of shares, partner GWT-TUD GmbH zu 75,1 % (reason: ministerial guideline for equity management of PROs)
- But: rights of vote 50 % : 50 %; profit distribution 75 % : 25 %
- Transparent contractual regulations for (1) Licencing of know how, (2) usage of infrastructure, (3) common use of employees

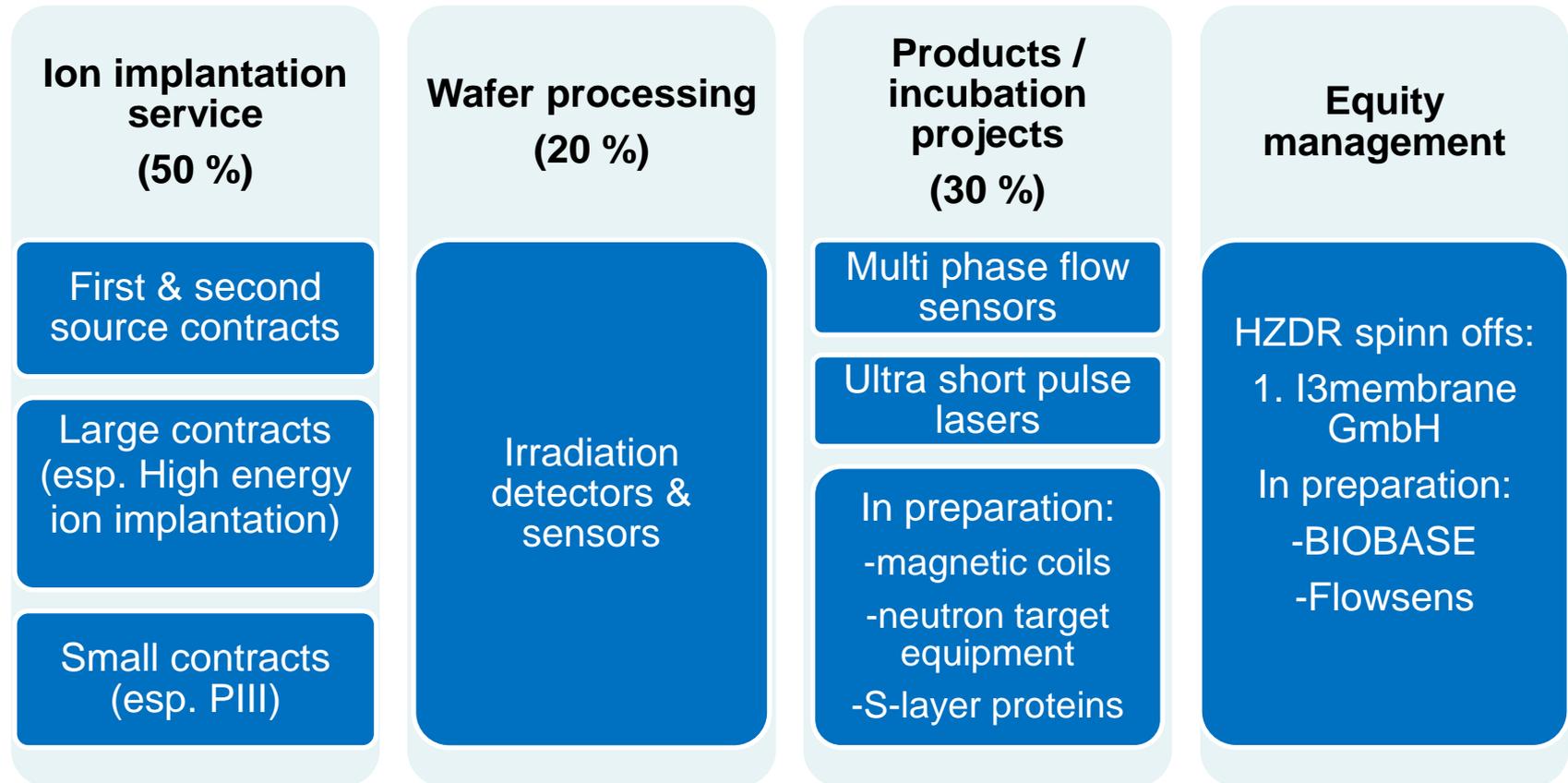


# Time plan of the foundation process



- Successful first year:
  - turnover 2012: 715 k€; 25 employees
  - profit 2012: 53 k€
  - Compensation of dramatic decrease of turnover with main client via acquisition of more than 60 new clients (esp. Ion implantation service)
- Plan 2013:
  - turnover: >1,0 Mio. €, profit: >120 T€
  - Qualification for of new second source contracts with global players
  - Installation of new ion implantation equipment (efficiency, capacity)
  - Establishment of new business fields (apart from ion implantation)
  - Start of equity management activities

# HZDR Innovation: Business Fields in 2013



# Filling the HZDR-pipeline: InnoManager-Model



**Dorit Teichmann**  
Innomanager  
Life Science



**Uwe Pöpping**  
Innomanager  
Fluid Dynamics



**Dr. Andreas  
Klossek**  
Innomanager  
Ressource  
Technology



**Dr. Stefanie Hartmann  
(IFW)**  
Innomanager  
Microelectronics

- Industrial expertise
- On site, close relationship to TTO of HZDR and HZDR Innovation
- Significant success im terms of third party funding & royalties

# Thanks for your questions!

[www.hzdr-innovation.de](http://www.hzdr-innovation.de)

[b.wolf@hzdr.de](mailto:b.wolf@hzdr.de)



# Implantation Facilities: Accelerators

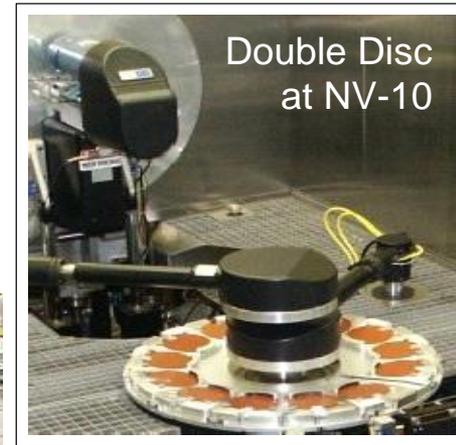
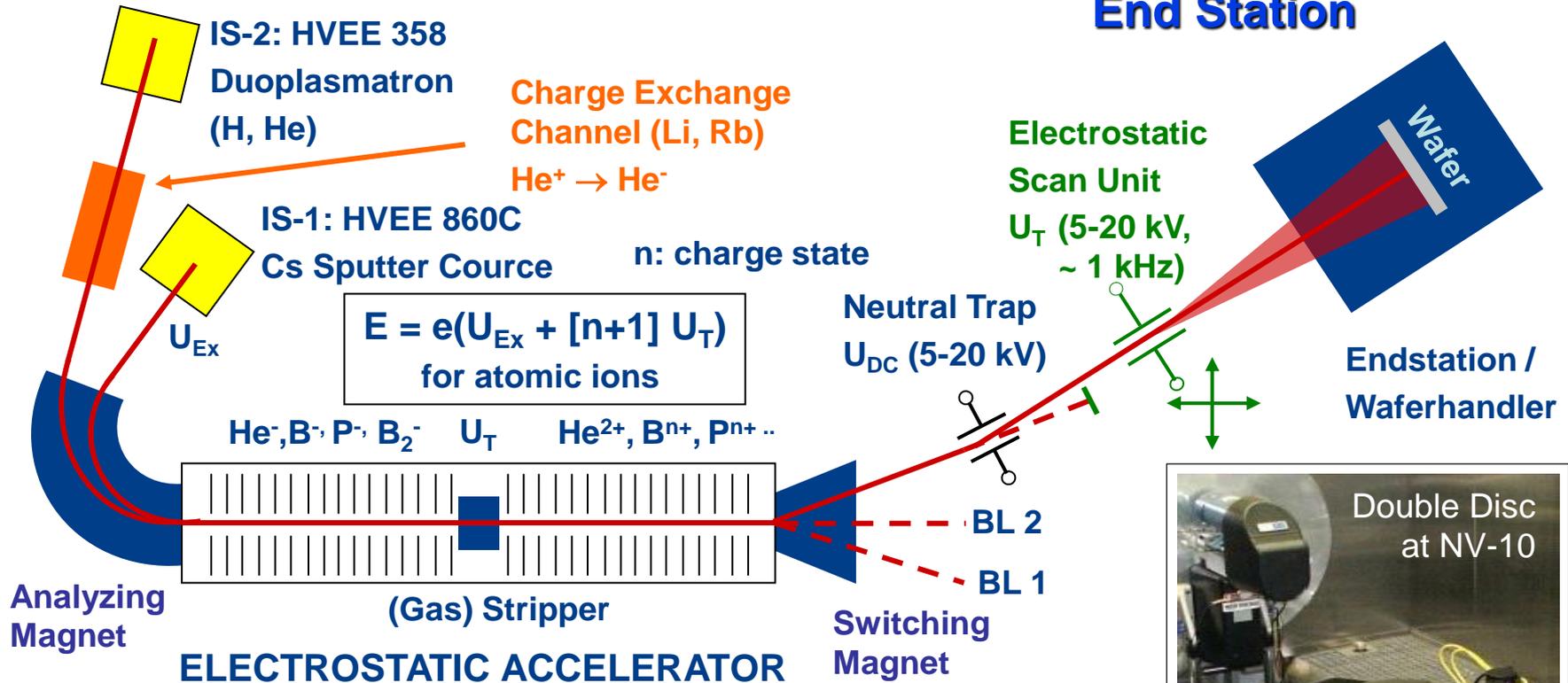
**Ion Sources**



**Accelerator**



**Beamline / End Station**



**Administrative  
Support**

GWT-TUD GmbH

HZDR  
INNOVATION

**Marketing &  
sales  
Production**

HZDR e. V.

**Infrastructure  
Know how  
First clients**

