Innovation in cooperation:
Enabling new deep-tech solutions for society
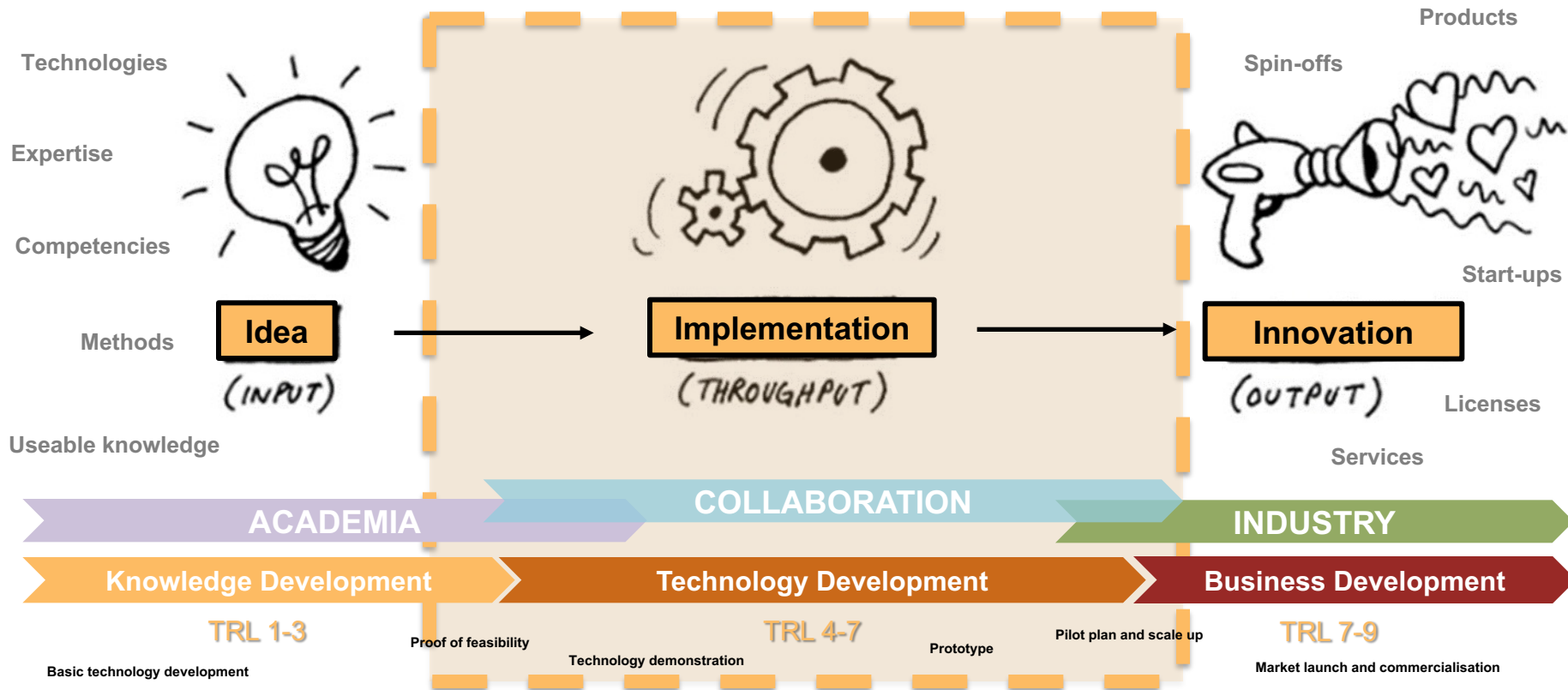
Dr. Martina Bauer

Technology Transfer
GSI Helmholtz Center for Heavy Ion Research GmbH

20th October 2023
Superconductivity for Sustainable Energy Systems and Particle Accelerators

Graphic: M. Spreng, GSI

Technologies

Expertise

Competencies

Methods

Useable knowledge

Idea

(INPUT)

Implementation

(THROUGHPUT)

Innovation

(OUTPUT)

Products

Spin-offs

Start-ups

Licenses

Services

COLLABORATION

ACADEMIA

INDUSTRY

Knowledge Development

Technology Development

Business Development

TRL 1-3

Proof of feasibility

TRL 4-7

Technology demonstration

Prototype

Pilot plan and scale up

TRL 7-9

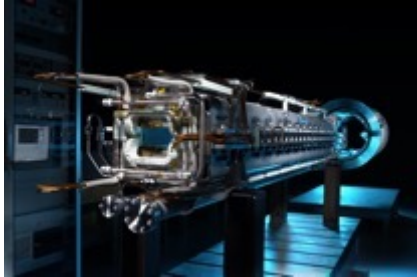Basic technology development

Market launch and commercialisation

…"the process of translating an idea or invention into a good or service that creates **value** or for which customers will pay."

"The value of an idea lies in the using of it."

Thomas Edison

High-Tech FAIR/GSI
Various Technologies, Know-how and Competencies

Superconductivity/ Cryotechnology

Magnet technology

Vacuum technology

IT-Technology/ Data processing

| Electrical/ Energy technology	High-voltage/high-power pulse technology	Space Research	Nano technology	High-frequency/ communications technology	Detector technology
Laser technology	(Micro-) Electronics	Control/regulation engineering	Metrology/ Sensors	Medical technology	Accelerator technology

1. Finding problems for our solutions - finding applications in industry and society
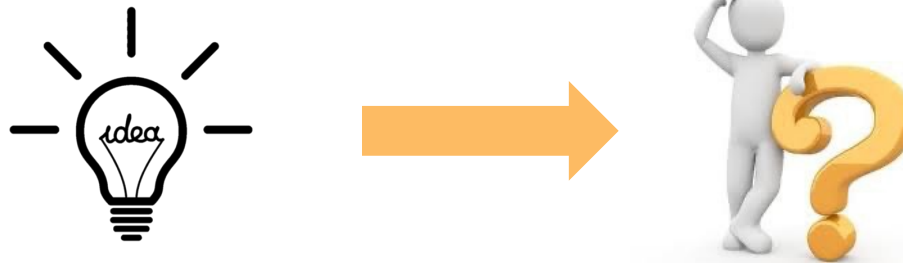
Talking to industry about their needs and challenges...
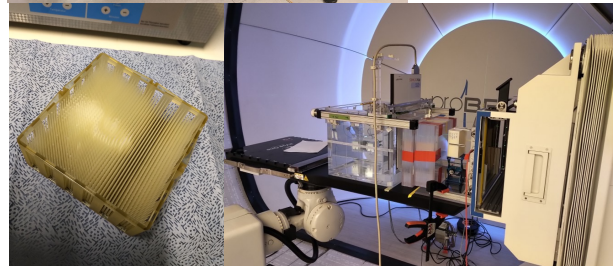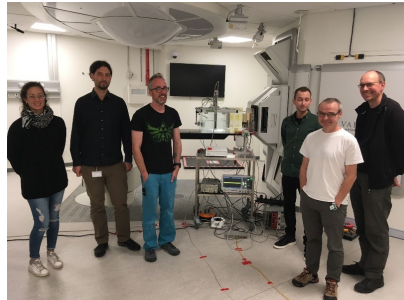## Industrial Exhibitions, AIMEs, Networks & Ecosystems

Industrial Cooperations with Industry & Start-ups
Exploring new technology topics and trends

- **GSI-Varian cooperation on range modulators for pFLASH**

- **GSI-Focused Energy cooperation**
  Mapping out the parameters for inertial confinement fusion

Source: https://focused-energy.world/

Transfer project „DRAHT-KATH"
Collaborative industrial research
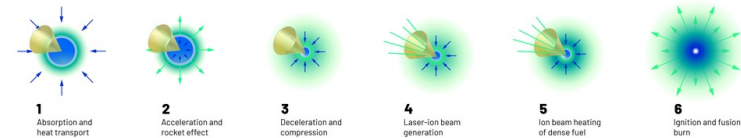
- GSI Material Science & Zentrum für BrennstoffzellenTechnik ZBT GmbH, Duisburg

Optimised membrane electrode unit of the PEMFC cathode catalyst layer
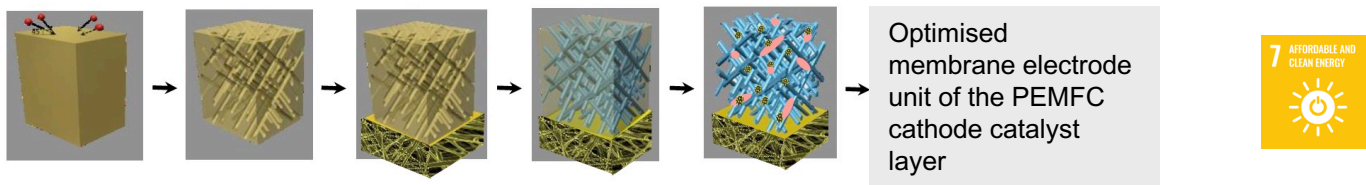
- Development of innovative cathode catalyst layers for high-performance PEM fuel cells by using template-assisted electrodeposition of GSI nanowire support structures.

Industrial project steering committee

Funded by

- Example: **ROSE - 4-dimensional emittance measurement system**
  - Successful transfer from the high-energy accelerator sector to industrial application at the medium-sized company NTG GmbH, Germany.

New algorithm to measure 4D ion-beam emittance	Patent	Validation Partner - NTG GmbH	Funding – 2 national grants	Industrial prototype of elecronic device (1st grant)	User-friendly software for automatisation of measurement and setting (2nd grant)	ROSE Scanner - New innovative product for the market (license) www.ntg.de

2. Highest priority for FAIR construction and project

- Limited R&D ressources for transfer projects

- Technology Push

- High investments in infrastructure (new and existing)

© ion 42, D. Fehrenz, GSI/FAIR

GSI/FAIR Green IT-Cube & Real-Lab "Digital Open Lab"
Making our infrastructure available for external partners

DIGITAL OPEN LAB offers…

Joint R&D - Offer for provision the infrastructure and IT competences of GSI and FAIR for joint development projects around about HPC, Big Data and ultra-fast data acquisition, including software development and products.

COLLABORATIONS - access to HPC systems and projects for external partners via collaboration projects.

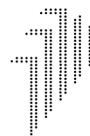**PROVISION OF RACK SPACE** - offer of services in the data centre.
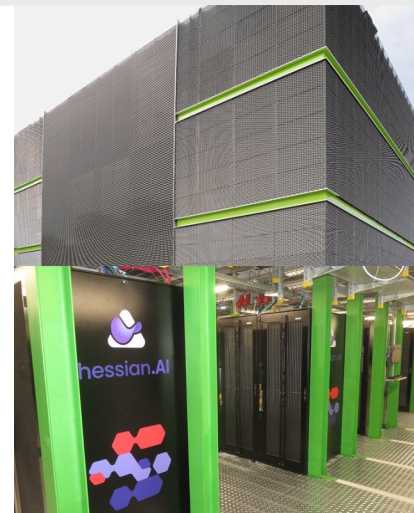
Hi-Acts - Helmholtz Innovation Plattform for Accelerator-based Technologies & Solutions

- Multi-sector innovation platform
- Accelerating the development of system-based solutions.
- Networking and Partnering opportunities
- Co-creation: joint development of novel approaches and solutions.
- One-stop-shop: easy access to Helmholtz's powerful R&D infrastructure and services.

GSI Use Case 2023:

"Standardized Test Station for High-energy Heavy Ion Radiation on Electronics"

- **Low Technology Readiness Level (TRL)** of technologies and **high R&D** need

ACADEMIA — COLLABORATION — INDUSTRY

Knowledge Development — Technology Development — Business Development

TRL 1-3 — Proof of feasibility — TRL 4-7 — Pilot plan and scale up — TRL 7-9

Basic technology development — Technology demonstration — Prototype — Market launch and commercialisation

Funding opportunities in Technology Transfer
Internal Innovation Fund and Public Funding

→ GSI/FAIR Innovation Fund
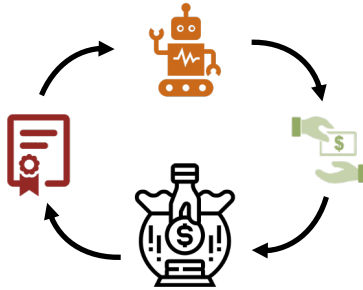
→ Public Funding Opportunities

HELMHOLTZ GEMEINSCHAFT
Validation Fond

iGF

WIPANO

VIP+

KMU-innovativ
Vorfahrt für Spitzenforschung im Mittelstand

ZIM
Zentrales Innovationsprogramm Mittelstand

digitales.hessen
DISTR@L

LOEWE
Exzellente Forschung für Hessens Zukunft

KMU-NetC
Mittelstand

HELMHOLTZ
SPITZENFORSCHUNG FÜR GROSSE HERAUSFORDERUNGEN
ENTERPRISE

eXIST
Existenzgründungen aus der Wissenschaft

ACADEMIA — **COLLABORATION** — **INDUSTRY**

Knowledge Development — **Technology Development** — **Business Development**

TRL 1-3	Proof of feasibility	TRL 4-7	Prototype	Pilot plan and scale up	TRL 7-9
Basic technology development		Technology demonstration			Market launch and commercialisation

FAIR/GSI - Innovation Fund
an Innovation Cycle

HELMHOLTZ

FAIR/GSI Innovation Fund

Start in 2022: 3 project funded
2023: 6 projects funded
Yearly budget: approx. 300 k€

Research Departments
Inventors

Funding by HGF

Own share GSI

financial return to

financial support of

* **Revenues** from:
- IP comercialisation/licensing
- Sales and services
- Contract research and manufacturing

- Feasibility studies
- Validation projects
- Service projects
- Start-up projects

increase of

enabling

Product-oriented **validation** and **further development** of **market-relevant technologies**

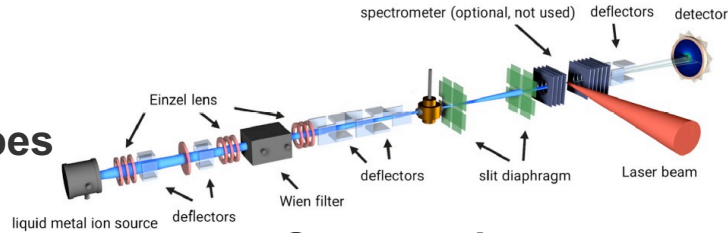# FAIR/GSI - Innovation Fund
Ongoing projects…

Vacuum
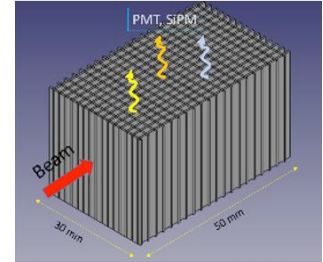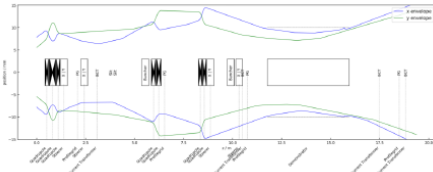CFK chambers for UHV
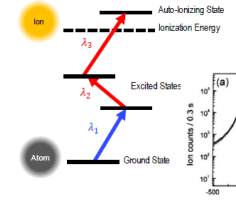
Radioisotopes
AVLIS

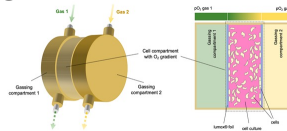**Compact ion sources**
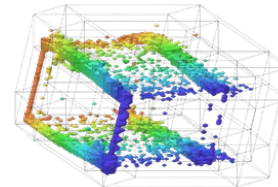Liquid metal ion source

Beam Diagnostics
OTR Pilot

Beam dynamic
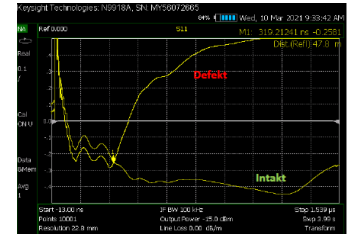Aperture3D

Vacuum
CF flange screw

Biotech
Hypoxia Chamber

Multidimensional Visualization (n>10)
RoSEN

Fault Detection
sTDR/ToF

Variety of opportunities for funding at different levels for energy efficiency and sustainability projects

„Helmholtz Sustainability Challenge": 2nd Call – Satellite Projects dedicated to provide funding for research projects in the thematic field of sustainable value chains and networks.

closed

Germany

State level: funding opportunities in the areas of energy efficiency and sustainability (including structural funds; **EFRE**). The basis for the exchange with the ministries is a project outline.

Federal level: large number of different programmes.

Variety of opportunities for funding at different levels for energy efficiency and sustainability projects

Horizon Europe

Funding opportunities in the pillar Research Infrastructures, Collaborative Research, Topics in the area European Innovation Council and Widening.

Please contact your Grant Office!

In case of GSI: a.vink@gsi.de or eu-support@gsi.de.

✓ Fostering an active exchange with industry to identify the relevant „problems for our solutions"

✓ Unique competencies, know-how and infrastructure is available to map out new technological trends and applications in cooperation with industrial partners.

✓ Co-creation with and early involvement of industry helps to reduce the time to market.

✓ Establishing formats to open our unique infrastructure and expertise to external partners.

✓ Several cooperation forms and funding opportunities are available!

Thank you for your attention!

Opportunities

Perspectives

Challenges