



# Welcome

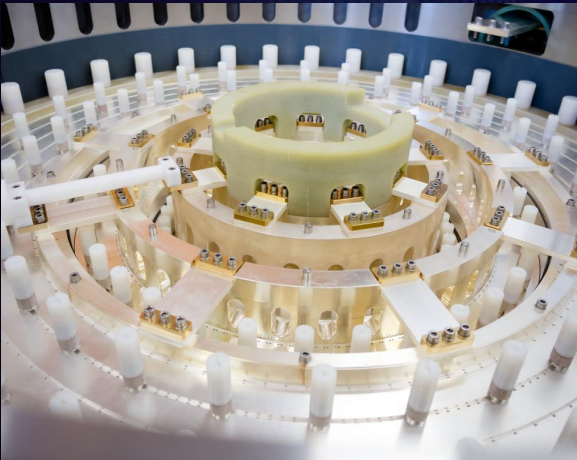
Meike Arnold  
18-09-2025

# HFML-FELIX: National research infrastructure

**Strongest resistive DC-magnets in Europe**

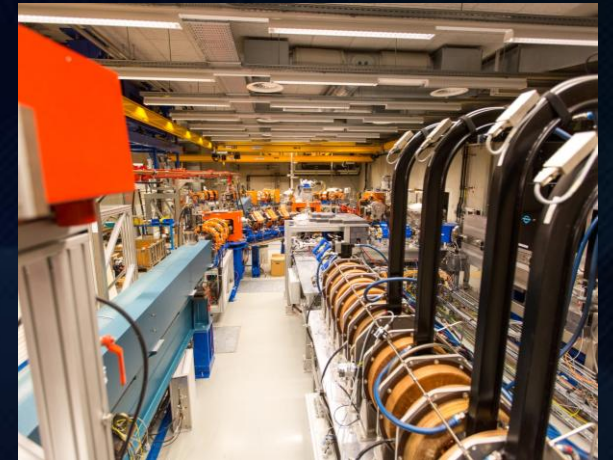
+

**largest IR/THz wavelength range in one facility**



6 magnets with a  
force-field  
of 30-38 tesla  
(45T hybrid  
magnet in  
development)

4 free-electron  
lasers that  
produce (far)  
infrared light



A research facility for national and international users,  
with a distinguished in-house research and engineering programme.



## HFML-FELIX: a national collaboration



As the newest of **10 national NWO-I institutes**, HFML-FELIX is part of a large network consisting of **NWO, Radboud University, 6 other Dutch universities** and **Radboudumc**.

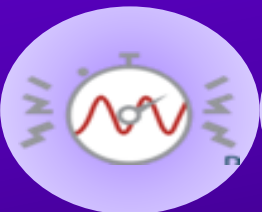
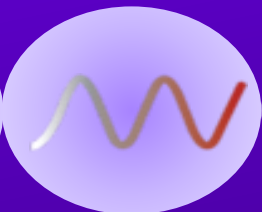


# Material research in extreme conditions

## EXTREME CONDITIONS

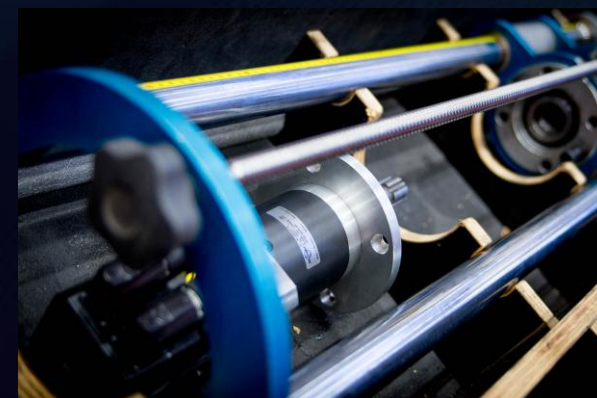
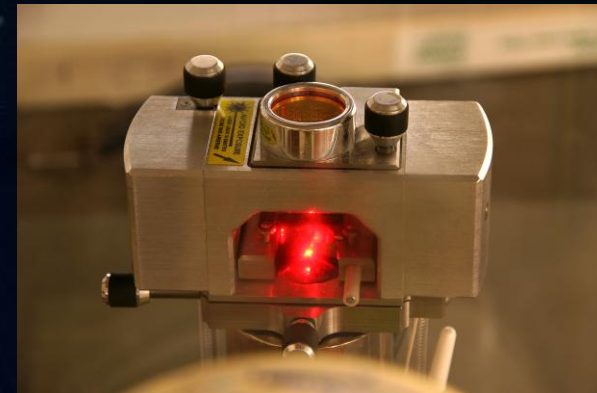


## Materials & Molecules



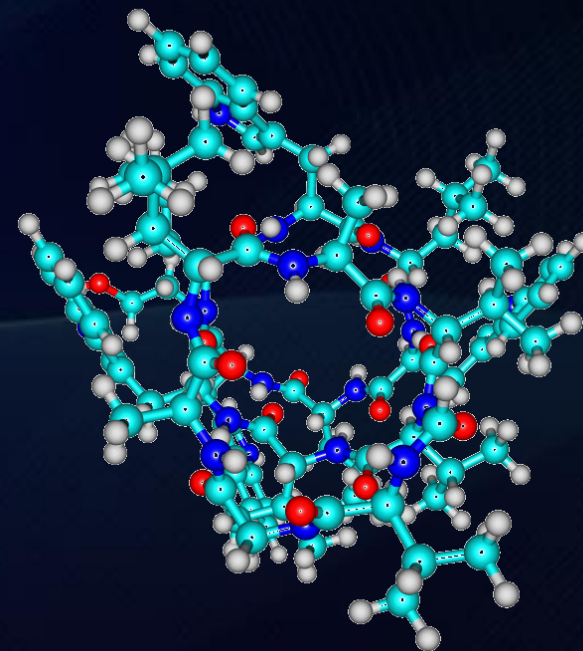
## ADVANCED INSTRUMENTATION

## Discovery of new characteristics

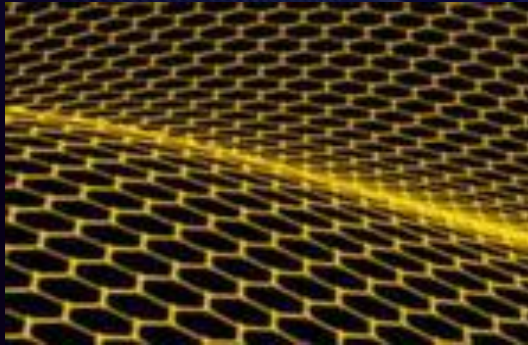




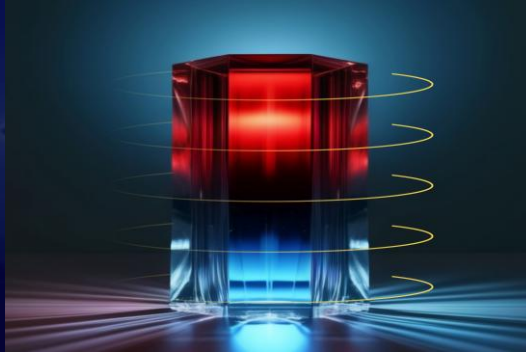
# Material research in extreme conditions



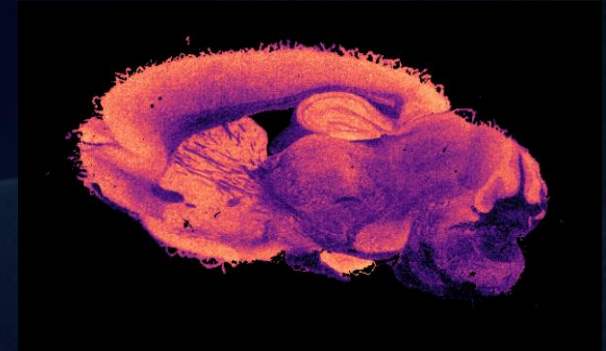
## Distinguished In-house Research Programme



**SMART  
MATERIALS**



**ENERGY AND  
SUSTAINABILITY**



**HEALTH**

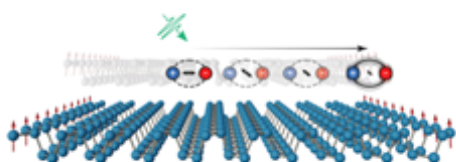
## Research lines conducted with our partners

- Mapping and manipulating quantum phases of matter
- Molecular structure identification and reactivity in infrared
- Dynamic self-organization in soft molecular matter
- Non-equilibrium phases of matter
- Innovative instruments for advanced Spectroscopy



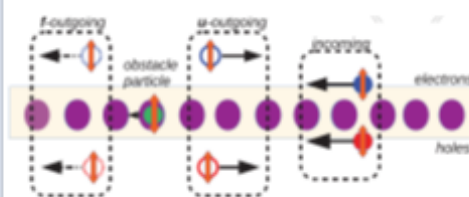
# Recent research-topics

## Nanoribbons



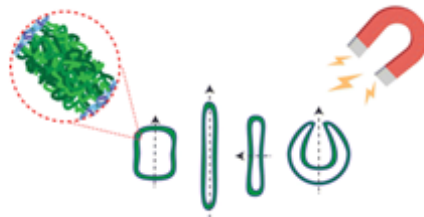
Nature **639**, 8054 (2025)

## Superconductivity



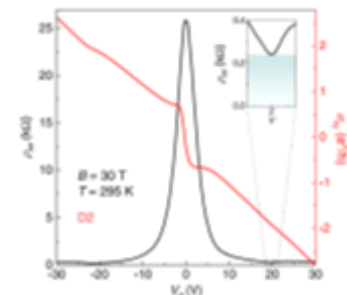
Science **382**, 792 (2024)

## Polymer Nanocapsules



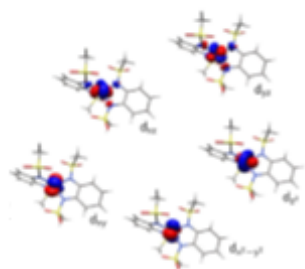
Soft Matter **20**, 730 (2024)

## Graphene



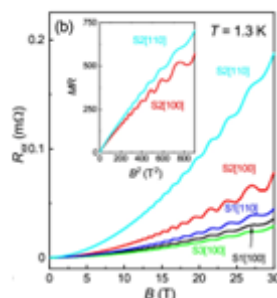
Nature Comm. **14**, 318 (2023)

## Molecular Magnets



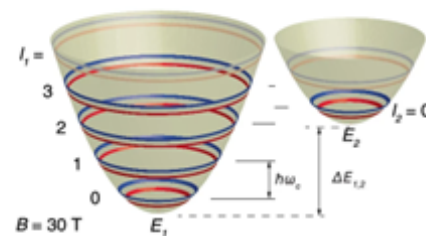
Nature Comm. **16**, 2157 (2025)

## Topology



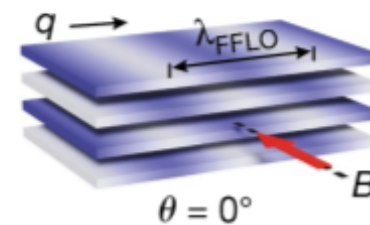
NPJ Quantum Materials **9**, 63 (2024)

## Quantum Hall Effect



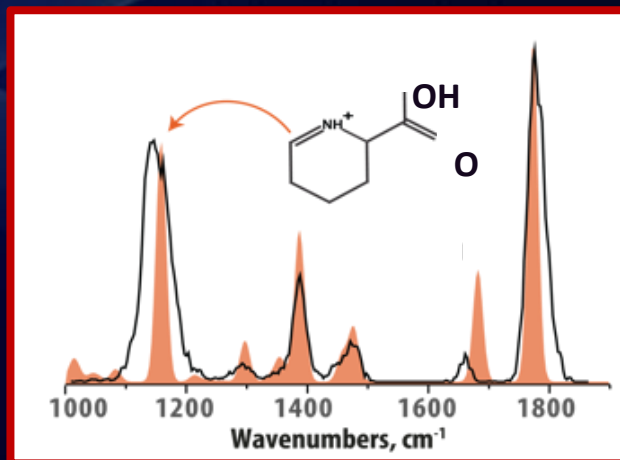
Nature Comm. **15**, 10052 (2024)

## Superconductivity



Nature **619**, 7968 (2023)

# Identification of biomarkers of metabolic diseases



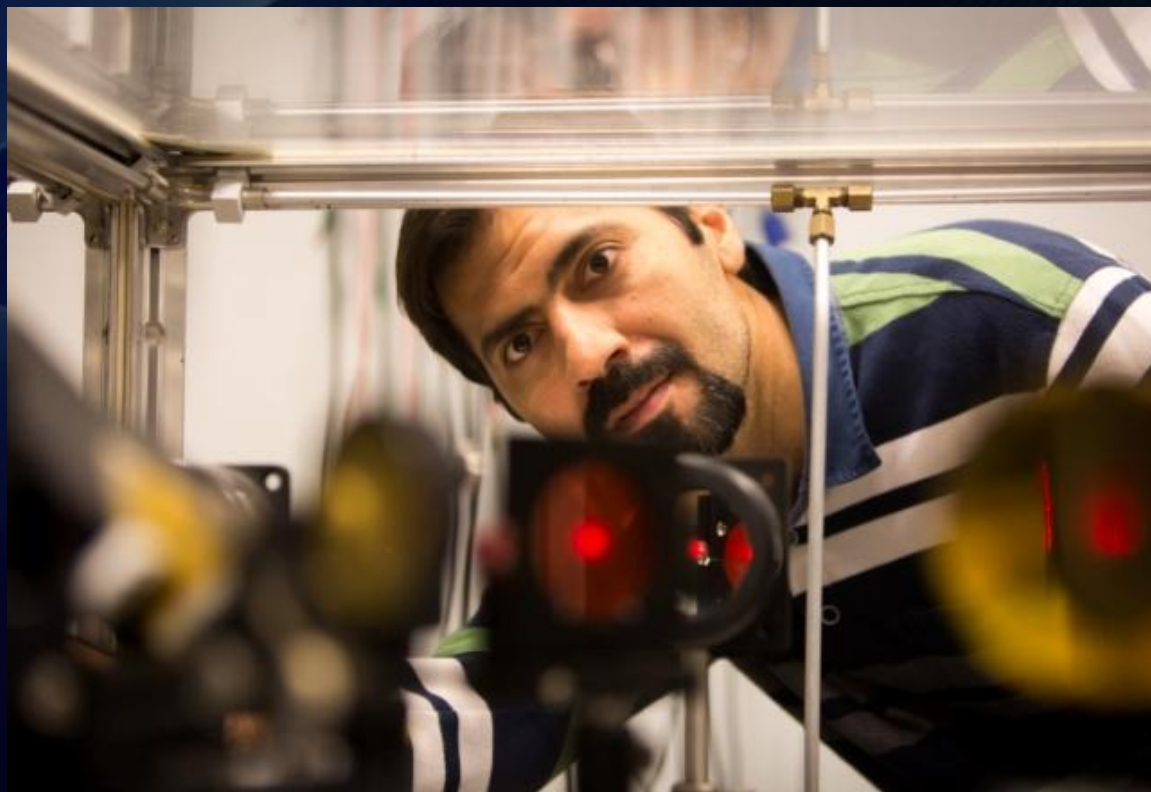
Biomarker  
identification

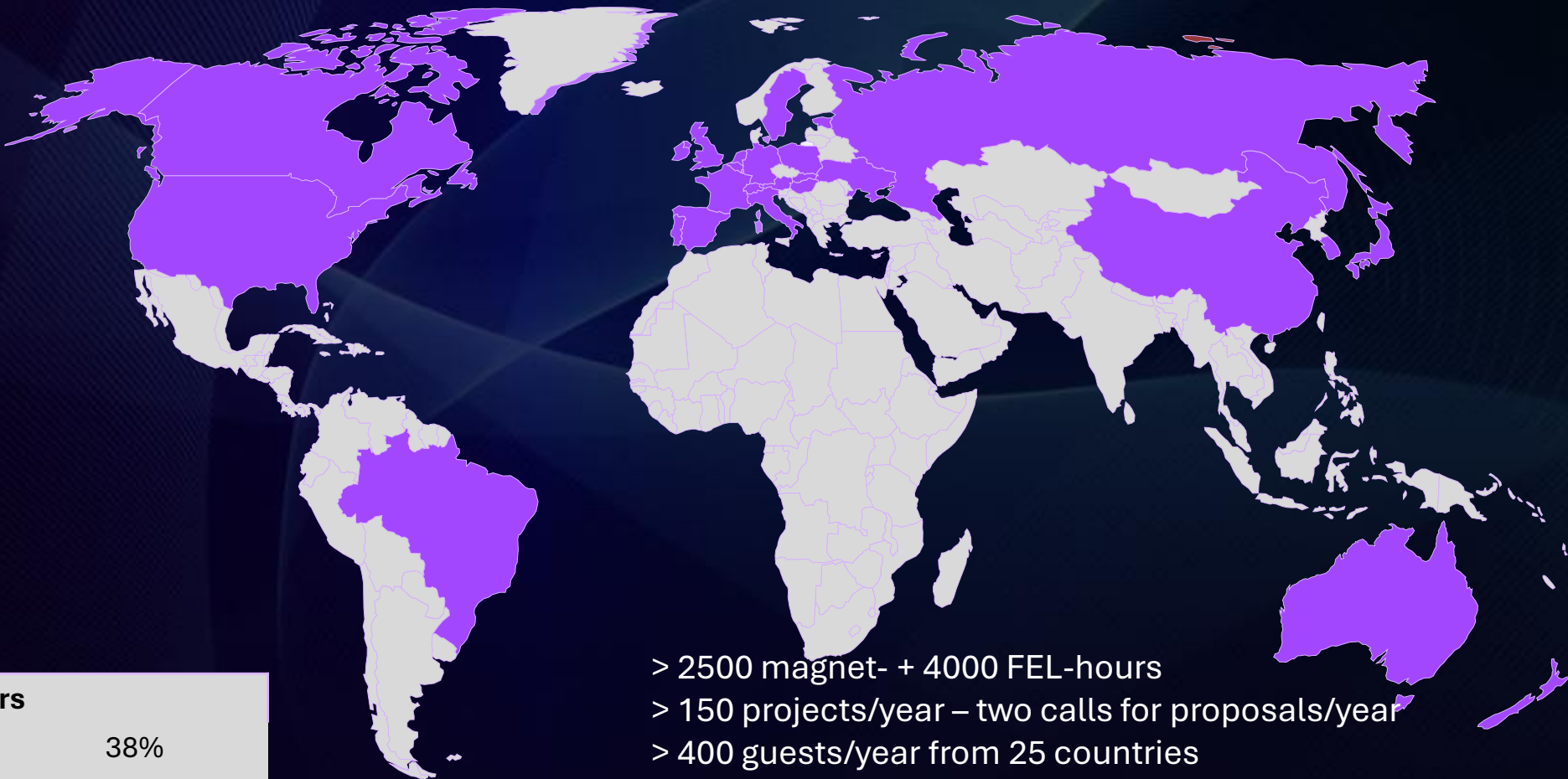


# NIFTI - National Individual Floating Transport Infrastructure









**HFML-FELIX users**

Netherlands	38%
EU	44%
Overseas	18%

- > 2500 magnet- + 4000 FEL-hours
- > 150 projects/year – two calls for proposals/year
- > 400 guests/year from 25 countries
- > 80 publications/year
- 85 employees (permanent & temporary) + students/internships
- Total investment ca. 100M Euro
- Annual budget 12M Euro

## Industrial research at HFML-FELIX

- Application with scientific proposal at one of the two deadlines (15 May and 15 November)
- Publication of the results in open-access scientific literature and presented at scientific conferences and meetings.

Examples of industrial research conducted at HFML-FELIX

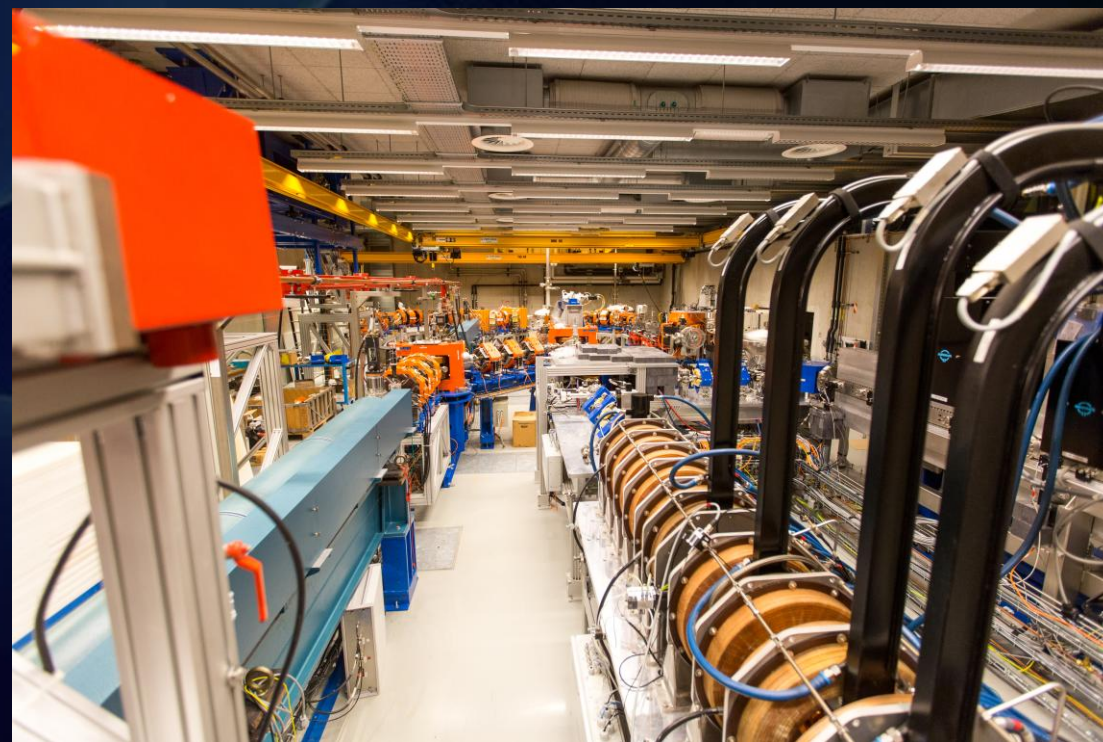
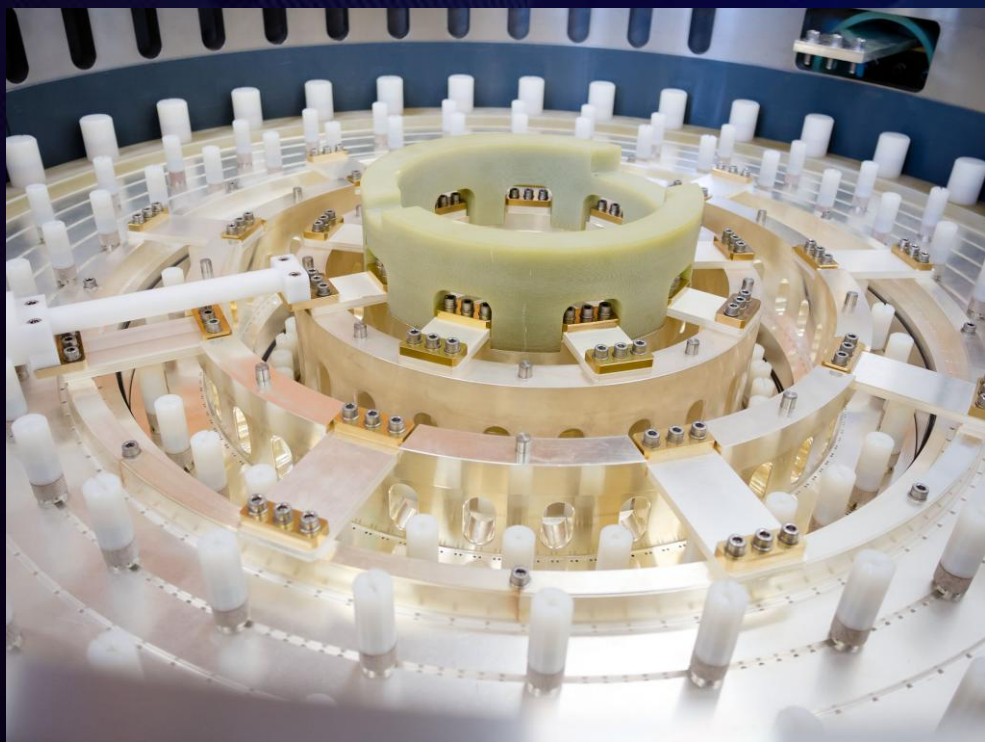


## Public Private Partnership

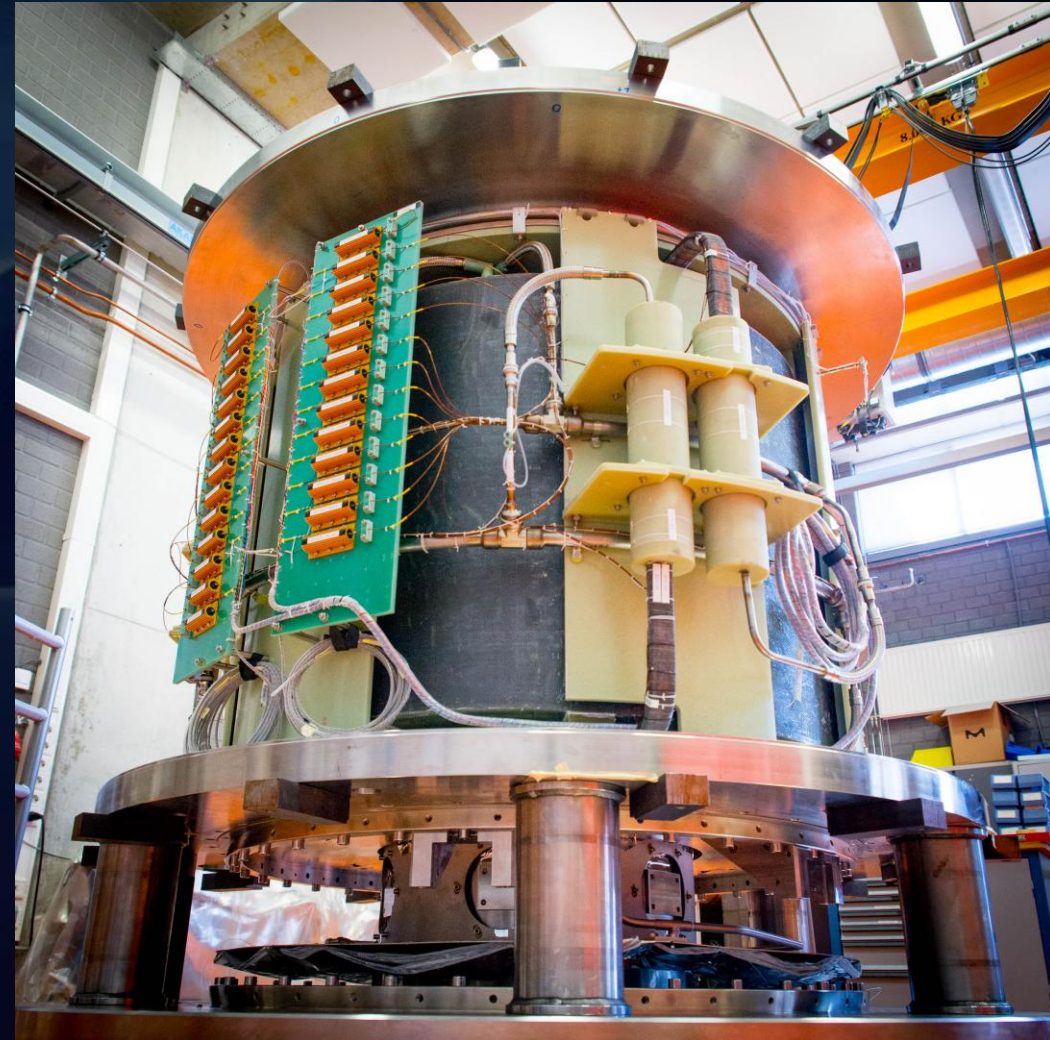
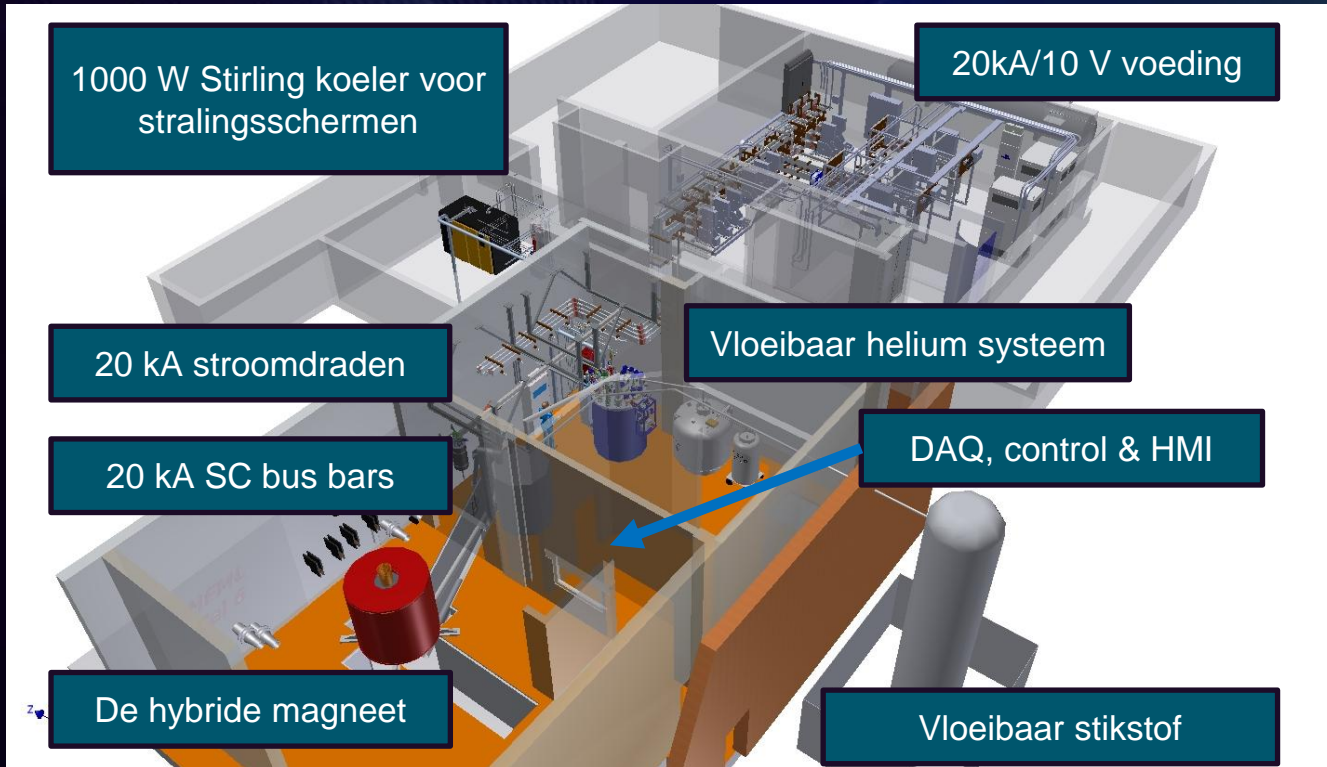
- Holland HighTech-Project: Accelerating Molecular Identification with Advanced Infrared Ion Spectroscopy (starting in 2026)



## Technologie state-of-the-art magneten, lasers & instrumenten



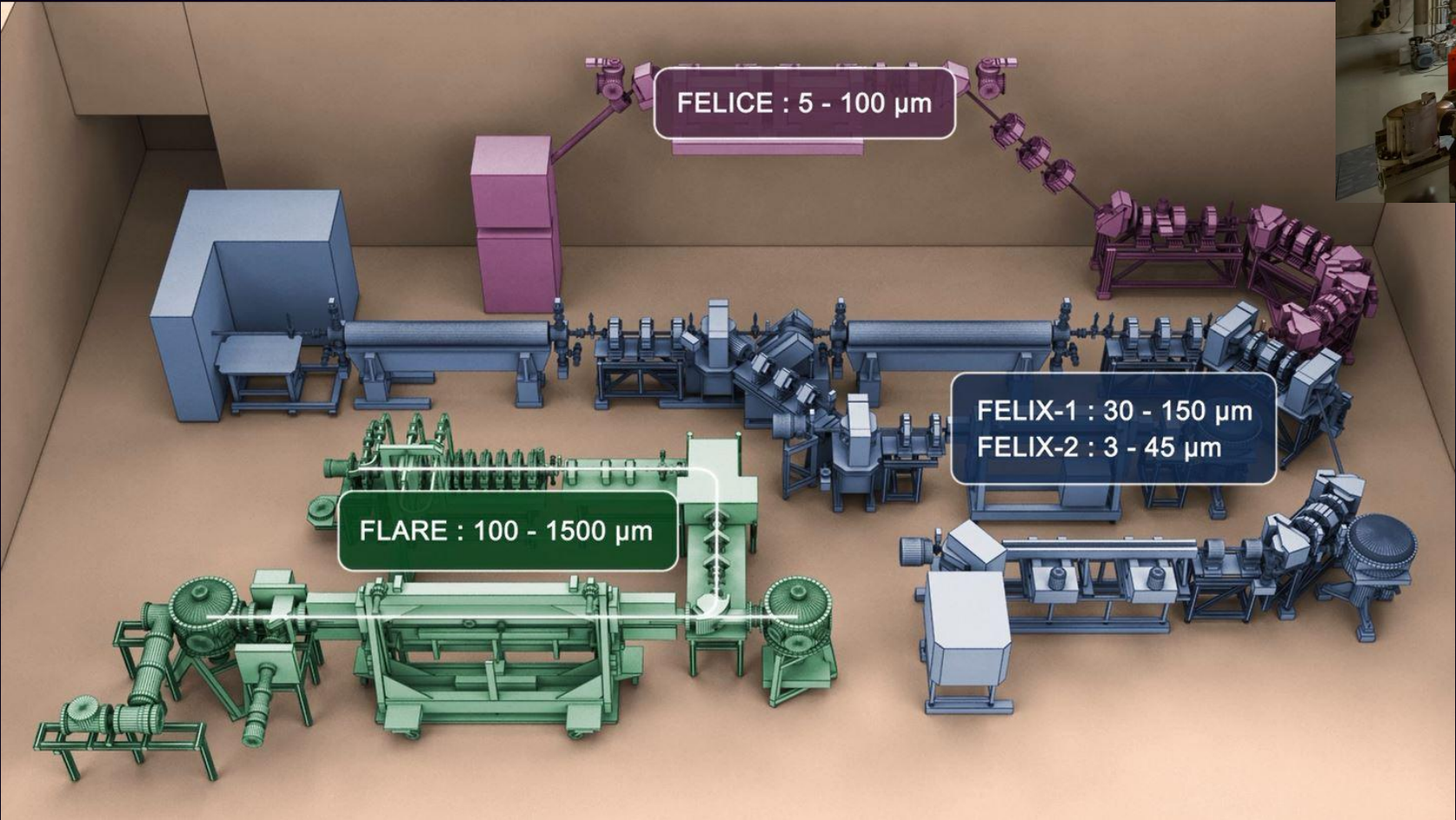








FELIX-Lasers





**Thank you for your attention!**

**Contact**

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