

Scientific Partnerships: DESY's Role in Ukraine

Meeting: Recovery Plan for Ukrainian Astronomy

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HELMHOLTZ



HELMHOLTZ WEIZMANN
RESEARCH SCHOOL
MULTIMESSENGER ASTRONOMY



Who am I?



📍 From Kharkiv, Ukraine

🎓 BSc & MSc, Kyiv, Ukraine; visited DESY during MSc (thanks to Iurii)

🔬 PhD at DESY Zeuthen, Germany

🌌 Involved in Ukrainian astronomical projects (parallel roles)



Scientific coordinator of all activities
with Eastern Europe



Hasinger



Henjes-Kunst



Member of the DESY-Ukraine working
group

DESY is more particle physics oriented



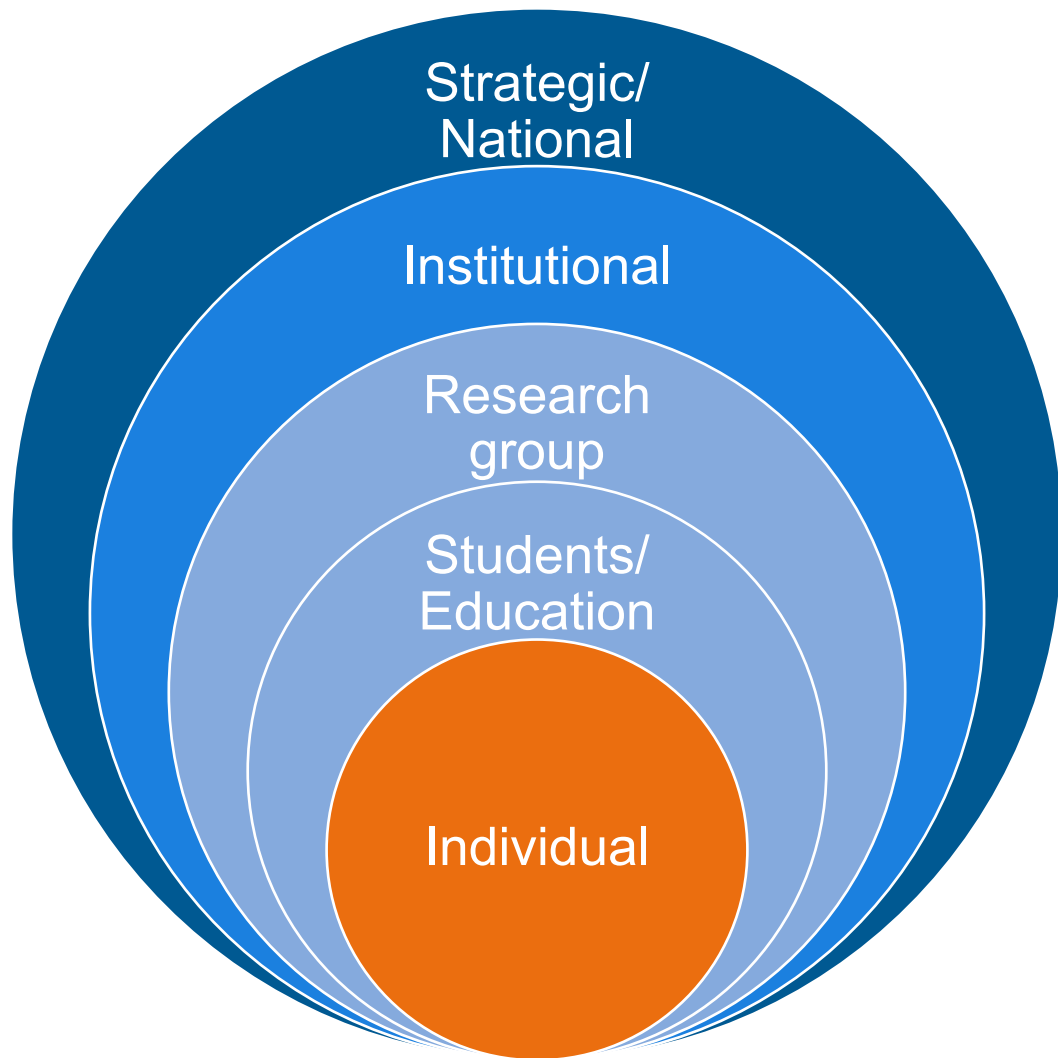
Stegmann



Sandhop



So many more



DESY's Engagement Across Scales in Ukrainian Science

Transatlantic Big Science Conference

Strategic/ National



A biennial forum co-hosted by DESY & USA to unite European and North American research leaders, share big-science best practices, (and now supporting Ukraine's research ecosystem).

Round Table “Supporting the Science System in Ukraine”

Co-Hosts: *Anatoly Zagorodny, National Academy of Sciences of Ukraine (NASU) / Martin Sandhop, DESY*



Priority issues:

- preservation of **personnel potential**;
- restoration of **damaged and destroyed infrastructure** of scientific institutions;
- **reproduction of protected areas** affected by hostilities;
- provision of institutes with **modern equipment**;
- **access** to international research infrastructures;
- establishing cooperation with the **new generation of the Ukrainian scientific diaspora**;

DESY travel to Kyiv 1-2 October 2024

Strategic/ National



Invited by Anatoly Zagorodny

- Visit the Presidium of the National Academy of Sciences of Ukraine
- Meeting at the Bogolyubov Institute
- Meeting with the director of the National Research Foundation of Ukraine (Olga Polotska)
- meeting with students and EURIZON fellows (suggested and organized)

Priority issues:

- Prepare a [Helmholtz Ukraine Workshop](#) in Ukraine to
- establish collaborative activities
- Send [decommissioned instruments](#) to Ukraine
- Allow [priority access to Helmholtz infrastructures](#) for PhD,
- to finish their research
- Explore more [summer students participation](#) at Helmholtz
- Establish [joint labs](#) Helmholtz-Ukraine, possibly with other
- EU partner labs

Ukrainian Recovery Conference

Institutional



1.Ukrainian Recovery Conference 2024 Round Table
– Hosted a round-table on scientific infrastructure recovery and international collaboration at the Ukrainian Recovery Conference 2024.

2025 - ?



DESY and KIPT (Sergii Fomin)

Institutional

Research group

Joint DESY– Kharkov Institute of Physics and Technology KIPT Grant Project

Funding: Two-year grant from the German Research Foundation

Sergii Fomin plays a key role in DESY's support of Ukraine

Donation of Scientific Equipment from CERN Reaches

Kharkiv



Kyiv



Sergii Fomin

DESY-Ukraine schools

Students/Education



DESY-Ukraine school

Covers projects in all research areas at DESY, complemented by a lecture series on the physics

DESY-Ukraine Winter School 2023:

22 students

6 weeks

DESY-Ukraine Summer School 2024:

14 students

8 weeks

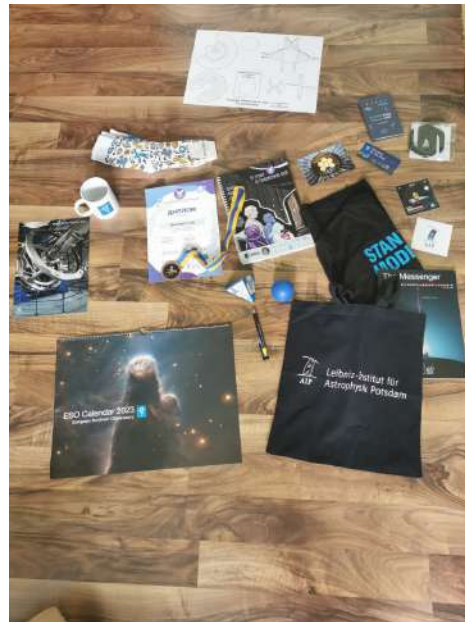
DESY-Ukraine Summer school 2025:



RAC Summer Schools

Individual

- Student's visits
- Support for students' projects
- Hosting PhDs for Ukrainian students
- And so many more



Scientific Partnerships: DZA's vision for Eastern Europe

Meeting: Recovery Plan for Ukrainian Astronomy

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10 June 2025

Neutron star merger, AEI Golm



DZA

1000

Jobs at DZA

35%

of which are scientific positions

65%

of which are science-supporting,
technical, and administrative positions

3

Job multiplication factor

AMBITIOUS PROCEDURE: SCIENCE AND REGIONAL EFFECTS

Total volume of proposal € 1.4 billion

Annual budget after start-up phase € 170 million



Mission and Vision of the DZA

Mission:

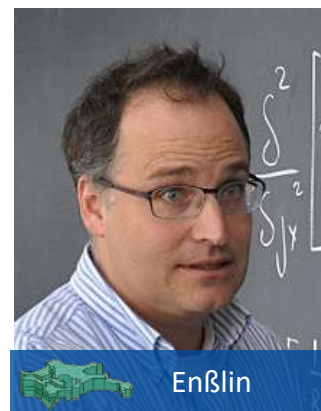
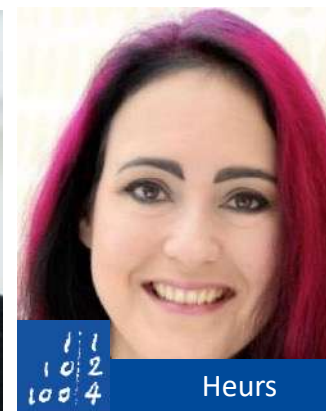
To establish a national center for astronomy, astrophysics, and astroparticle physics, supporting the German scientific community.

Vision:

To become **a global hub** for cutting-edge research in multi-messenger astrophysics, data science, and technological innovation while contributing to **regional economic transformation** in East Germany.

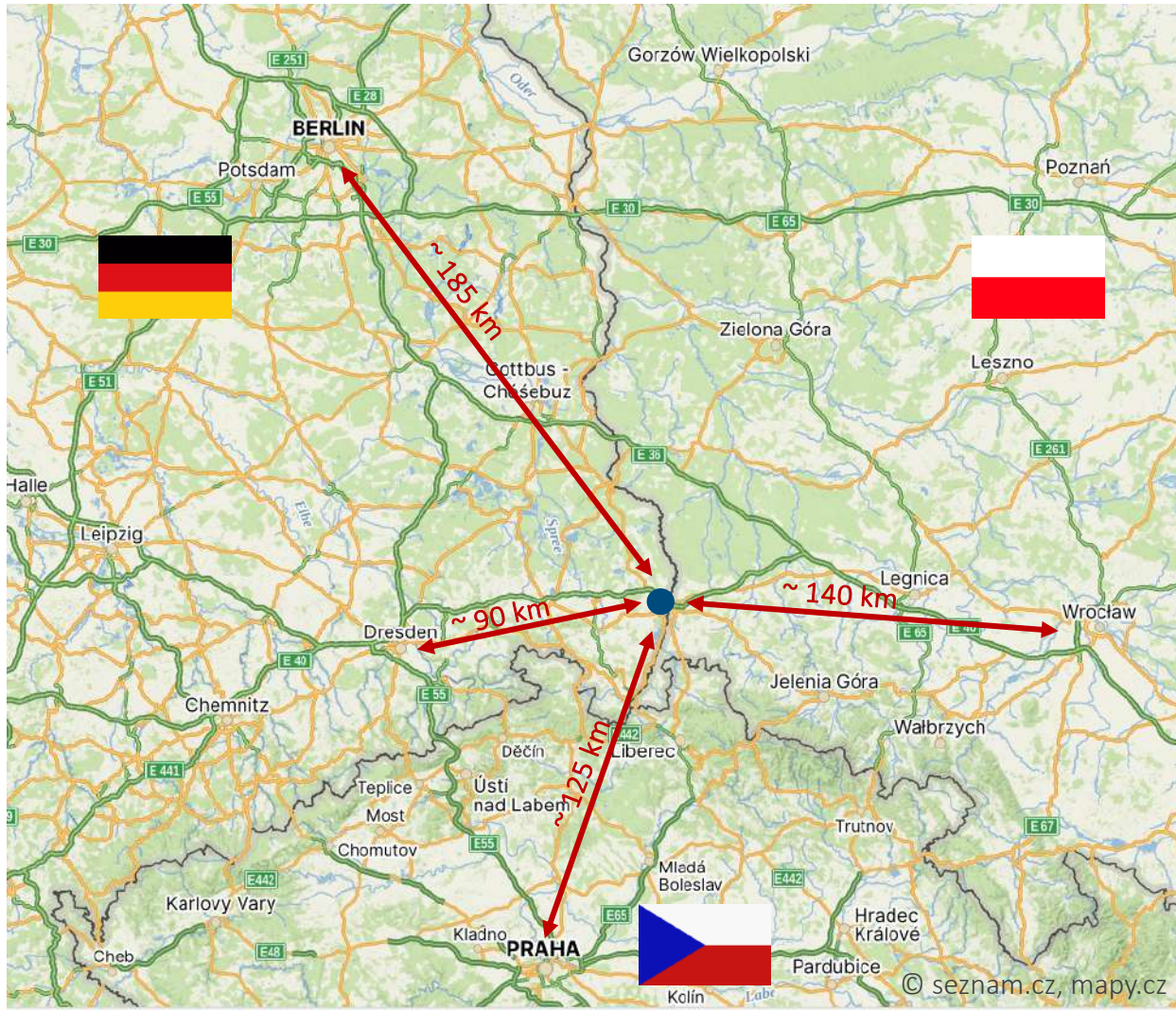


DZA Team and Network



Stadt Görlitz

DZA – in the heart of Europe



COLLABORATION WITH THE CZECH REPUBLIC
AND POLAND IS NATURALLY OCCURRING.
FOLLOWING WITH BALTIC COUNTRIES; AND
UKRAINE IN FUTURE

DZA – in the heart of Europe



**COLLABORATION WITH THE CZECH REPUBLIC
AND POLAND IS NATURALLY OCCURRING.
FOLLOWING WITH BALTIC COUNTRIES; AND
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**Signed letters of intent with Czech institutions on
May 16, 2025**

- Czech Academy of Sciences
- FZU – Institute of Physics
- Astronomical Institute
- Charles University (Faculty of Mathematics and Physics)
- Czech Technical University(Faculty of Nuclear Sciences and Physical Engineering, Faculty of Electro-engineering)

Will to achieve the same with Poland in late 2025

pre-agreements with Warsaw, Krakow, Torun,
Wroclaw...

Radio Astronomy – the Square Kilometer Array (SKA)

- DZA will enhance the German contribution to SKA to provide access for the entire German community and enhance the SKA capabilities.
- **Technology development and computing**
 - receiver technology and
 - data science (SKA Regional Centre)
- **Early astrophysics:**
 - MeerKAT+
 - Theory



Signature of MoU between DZA and Botswana University BIUST, February 27, 2024

BIUST, SARAO, MPG, DZA **SIGN MOU** FOR BOTSWANA'S **FIRST RADIO TELESCOPE**

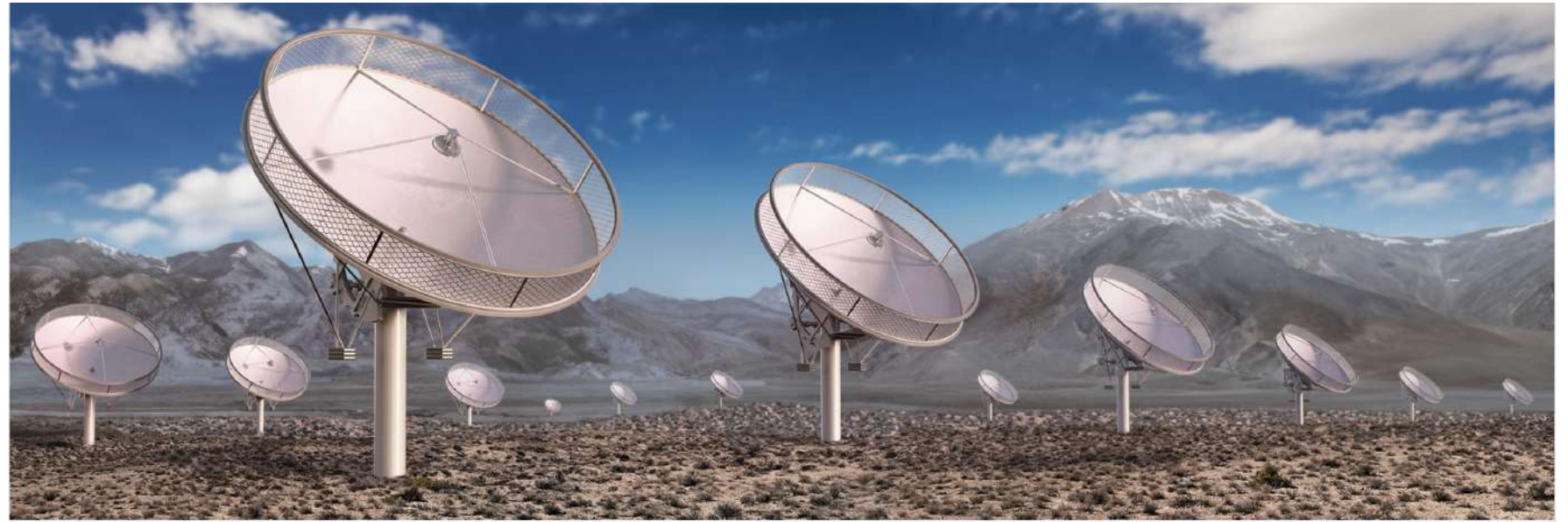


BIUST PARTNERS WITH **INTERNATIONAL BODIES TO** ADVANCE RADIO ASTRONOMY



For the first leg of an African VLBI Network (AVN) in Botswana, on February 27, 2024

DSA-2000 Project



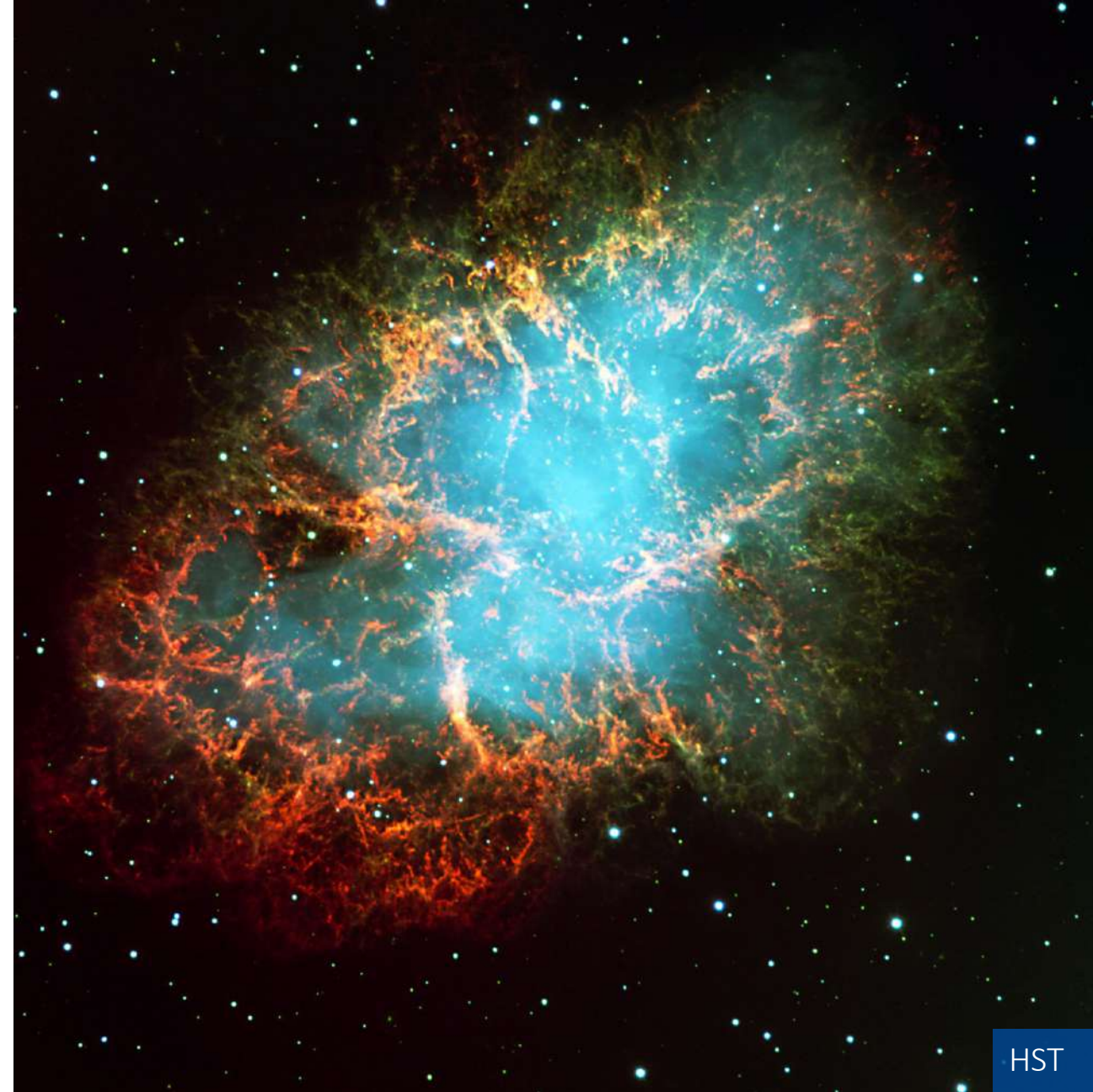
DSA Test-Array in Eastern German

- Ability to conduct **tests for the DSA-2000**
 - **Receiver stability** → maximum signal level to keep signal chain out of nonlinearity
 - **Continuum** → maximal bandwidth for effective tests
 - **Low light pollution** → pointing tests with an optical/IR camera
- Ability to conduct **radio astronomical observations**
 - **Continuum** → maximal bandwidth
 - **HI, OH Lines** → minimal contamination
 - Backends for time tomain + pulsar science
- **Education/Outreach**
 - Accessibility!
 - University & Local partners



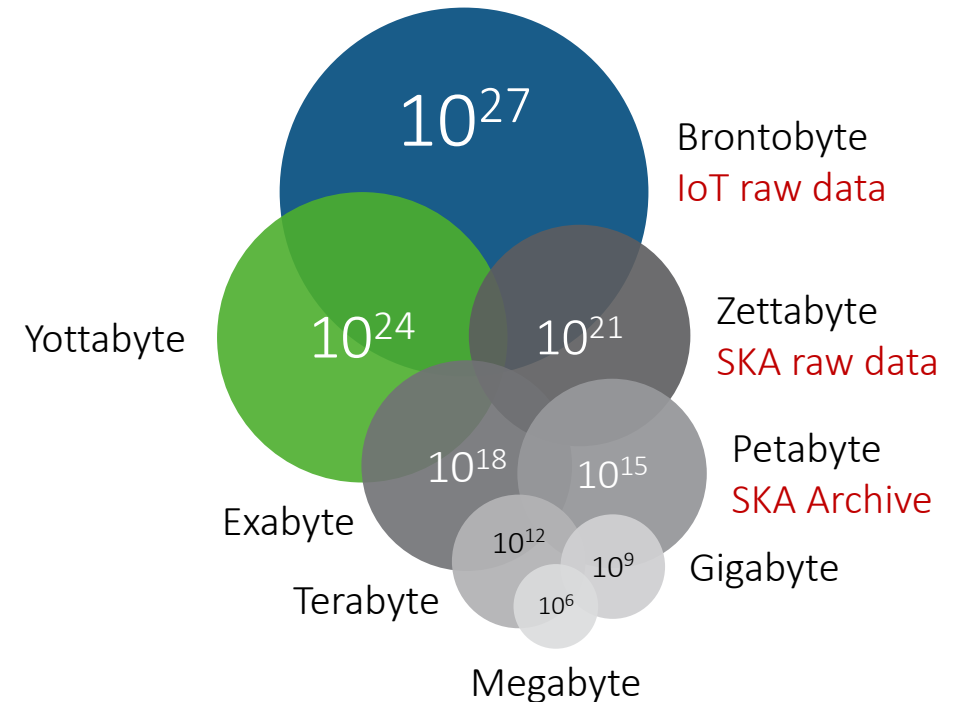
Optical Astronomy

- A critical role will be played by **Survey and Time-Domain Projects**.
- Will provide critical, real-time data on transient events, integrating well into **multi-messenger astronomy**.
- DZA will build up a branch in optical astronomy in the forthcoming years.



Data Science – the third pillar

- SKA will pose unprecedented challenges for **data management**, but other infrastructures will also produce enormous amounts of data.
- DZA aims to contribute to **SKA-Regional Centre** network
 - plans to facilitate the integration of major data sets for multiband studies
 - intends to provide resources for computation and storage
 - will develop ML/AI technology in astrophysics data management



The Low Seismic Lab

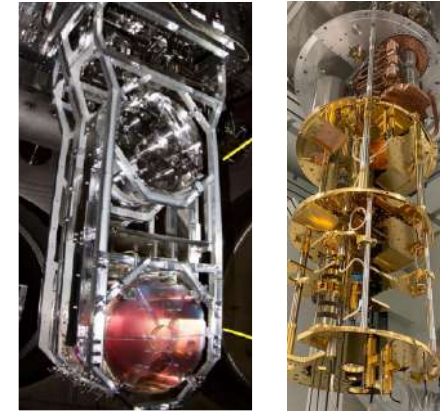
Innovation platform of approx. $(40 \times 30 \times 30) \text{ m}^3$ in 200m depth in the Lusatian granite

With a square kilometre 3D seismometer sensor array.

- Metrological validation of advanced seismic isolation concepts on a large scale

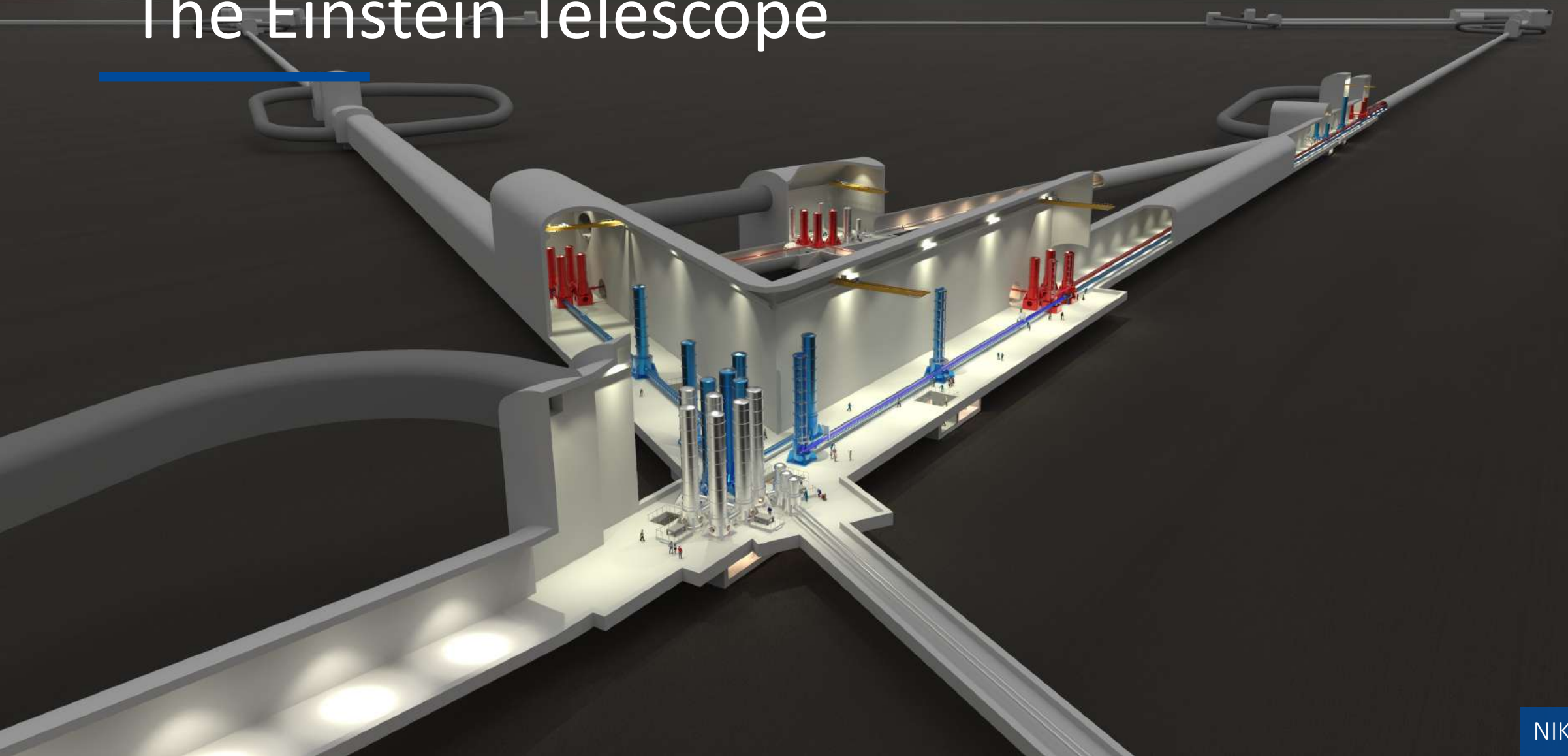
THE PLACE FOR FUTURE "DEEP TECH":

- Technology development for gravitational wave astronomy
- Adaptive seismic noise reduction
- Astrophysics with accelerators
- Low noise detector development
- Subnanometer microscopy and photolithography
- Quantum computing experiments



NIKHEF, NL

The Einstein Telescope



NIKHEF, NL

DZA is creating impact – Signature of the cooperation agreement between DZA and NIKHEF, October 4, 2024

- Collaboration between the German Centre for Astrophysics (DZA) and Nikhef (Netherlands) for the Einstein Telescope
- Further cooperation agreements are in preparation



What next steps could be with DESY and DZA ?



SOLARIS

Strategic/ National



Light for Ukraine

synchrotron workshop at SOLARIS
towards Nano and micro X-ray spectroscopy applications

“Light for Ukraine” is a LEAPS-led initiative, coordinated by SOLARIS, that unites and supports Ukrainian users of 3rd- and 4th-generation light sources—providing a central information hub, workshops, and collaborative efforts toward a future Ukrainian synchrotron facility.



RÅC Summer Schools

Students/Education



- EURIZON supports invitation of young scientists from EU & Ukraine to RÅC Summer Schools
- RÅC-2024: 5 fellows from Ukraine: Taras Shevchenko University, Karazin Kharkiv National University; Kharkiv Polytechnic Institute; Kurdyumov Institute for Metal Physics of the NASU; Frantsevich Institute for Problems of Materials Science NASU
- Next year: in Estonia!

