Hamburg Quantum Innovation Capital

Combined expertise in quantum technology from research to application

Artificial Intelligence Center Hamburg (ARIC) e.V.

AI- & Quantum-Technology

Regional Future Center North, RZ. North: Advice and assistance on the application of AI in SMEs and public institutions
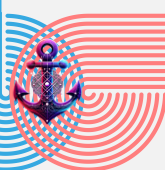
European Digital Innovation Hub, EdiH (EU): Network of Excellence Hub; Implementation of prototypes 'test before invest'

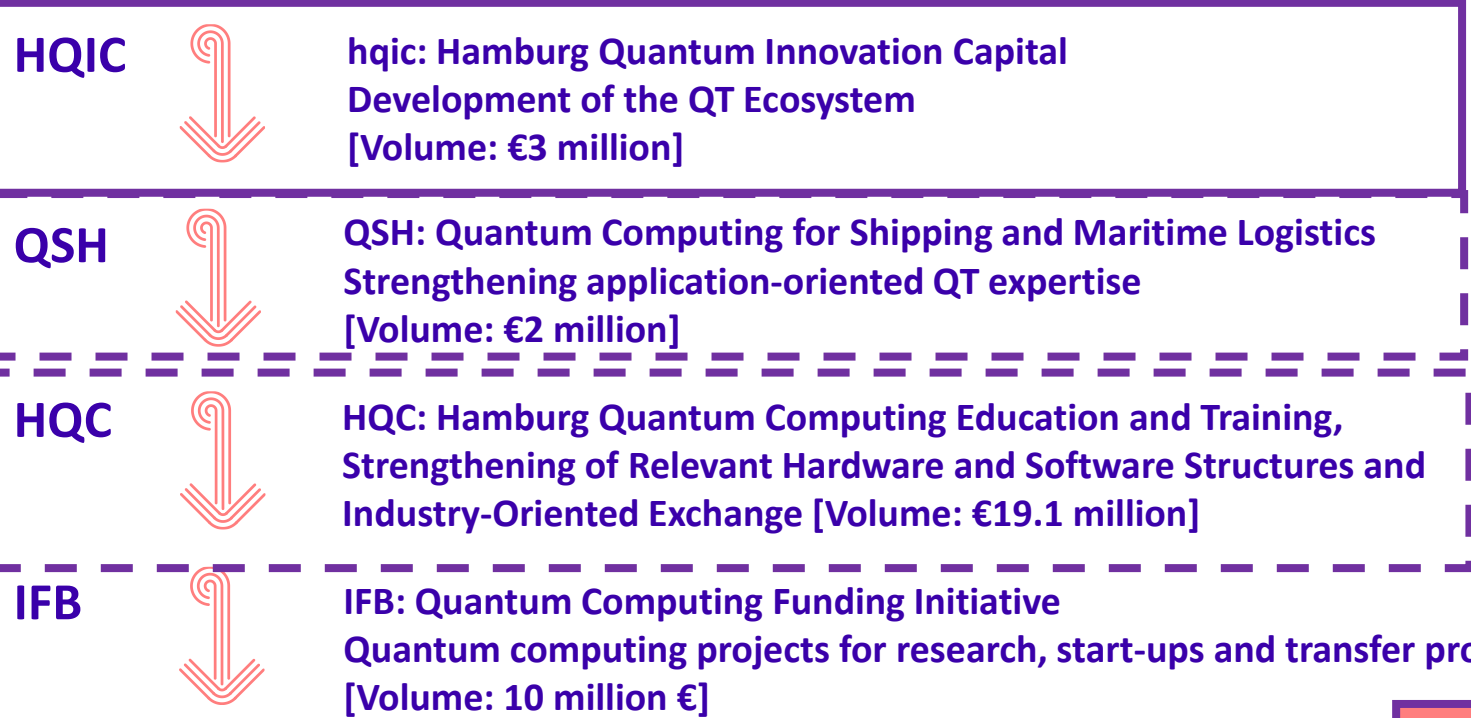**AI STARTUP HUB HAMBURG:** One of five nationwide model regions for the promotion of AI startups

Hamburg Quantum Innovation Capital, hqic: Systematic expansion of Hamburg as a location for quantum economy

Hamburg

IFB HAMBURG | Hamburgische Investitions- und Förderbank

Co-funded by the European Union

Development of the QT site in Hamburg

HQIC

hqic: Hamburg Quantum Innovation Capital
Development of the QT Ecosystem
[Volume: €3 million]

QSH

QSH: Quantum Computing for Shipping and Maritime Logistics
Strengthening application-oriented QT expertise
[Volume: €2 million]

-> 30. April 2024 um 12:00 Uhr |
Ms. Dr. Anisa Rizvanolli

HQC

HQC: Hamburg Quantum Computing Education and Training,
Strengthening of Relevant Hardware and Software Structures and
Industry-Oriented Exchange [Volume: €19.1 million]

-> 28. Mai 2024 um 12:00 Uhr |
Prof. Henning Moritz

IFB

IFB: Quantum Computing Funding Initiative
Quantum computing projects for research, start-ups and transfer projects
[Volume: 10 million €]

Total volume FHH: € 34.1 million

+

+

Funding Landscape Quantum Metropolis Hamburg -
Number of funded projects: 17
Funding period: 2020 - 2028
Total funding: approx. € 95 million

QCI

DLR: Quantum Computer Initiative
Construction of various Systems based on ion traps +
approx. 10 project assignments with companies and start-ups from the quantum metropolis of Hamburg
[Volume: €208.5 million]

hqic

Hamburg Quantum Innovation Capital

Target Group

Science, education and training

Startups & Incubators

Research Institutes

SMEs & Large Enterprises

Public Sector

Private Sector

hqic

Offerings
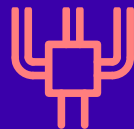
Hamburg Quantum Innovation Capital

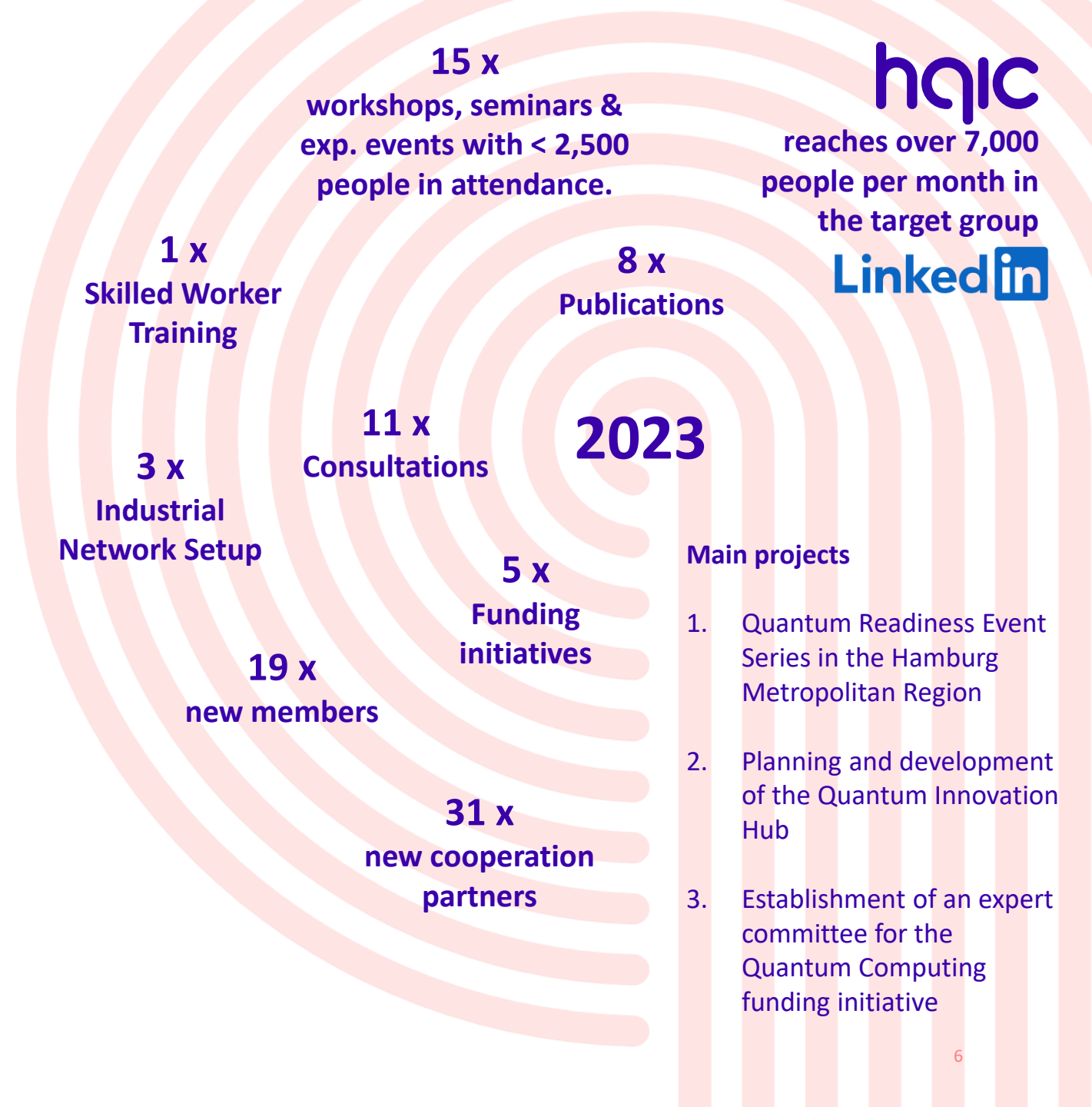- **Knowledge- & Technology-transfer**
- **Start-up- & Industry-funding**
- **Network- & Location-Development**
- **Education- & Public-Relations**
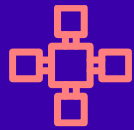
Hamburg Quantum Innovation Capital

Key Figures

Research

Professionals

Transfer

Industry

Profiling

Society

hqic

15 x
workshops, seminars &
exp. events with < 2,500
people in attendance.

1 x
Skilled Worker
Training

3 x
Industrial
Network Setup

11 x
Consultations

8 x
Publications

reaches over 7,000
people per month in
the target group

Linked in

2023

5 x
Funding
initiatives

19 x
new members

31 x
new cooperation
partners

Main projects

1. Quantum Readiness Event Series in the Hamburg Metropolitan Region

2. Planning and development of the Quantum Innovation Hub

3. Establishment of an expert committee for the Quantum Computing funding initiative

Target group-specific formats

Industry Clusters and Applications

Energy and Materials

Aviation and Advanced Industries

Life Science and Health

Communication and Cryptography

Transport & Logistics

Webinars & Online Courses

Talent Pooling

Project planning, consortium formation and coordination

Inkubations- und Accelerator-Programme

Technology-monitoring

Community-Events und Meetups

Quantum Readiness

Fast Quantum Use Case Check

Conferences and symposia

Summer Schools

Matchmaking

Development of formats

Demo-Tage

Universities and Research Institutes

Hardware Platforms

Neutral Atom

Ion traps

Supraleitend

Hardware Architectures

- The QT/QC site encompasses multiple hardware architectures, which underpin the integrated co-design of hardware and software tailored to each architecture.

- This foundational setup enables comprehensive development of hardware, software, applications, and essential enabling technologies at the site.

Research and development

TUHH Technische Universität Hamburg

Fraunhofer

NXP

U·H Universität Hamburg
DER FORSCHUNG | DER LEHRE | DER BILDUNG

DESY

DLR Deutsches Zentrum für Luft- und Raumfahrt

Hardware Platforms

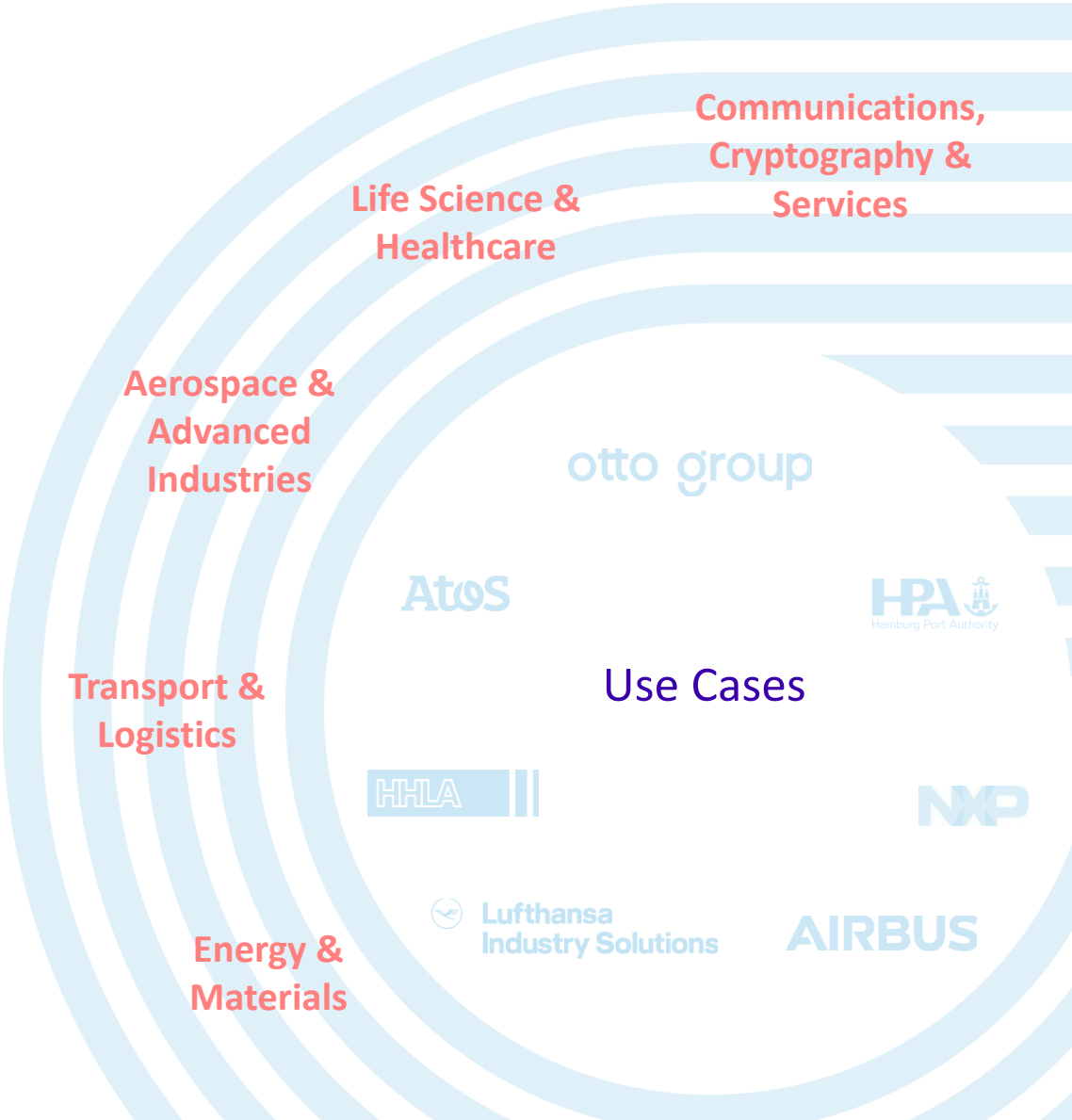| Atomfallen	Ionenfallen	IBM Quantum
QYMAX	DLR Deutsches Zentrum für Luft- und Raumfahrt	DESY
U·H Universität Hamburg DER FORSCHUNG	DER LEHRE	DER BILDUNG		Fraunhofer

Development of new formats

2024: in Planning

2023: Economy – Needs Analysis + Industrial Education: Roundtable discussions, applications, potential analysis

Communications, Cryptography & Services

Life Science & Healthcare

Aerospace & Advanced Industries

Transport & Logistics

Use Cases

Energy & Materials

Network & Location Development

Quantum Innovation Hub / Transfer & Training Labs:
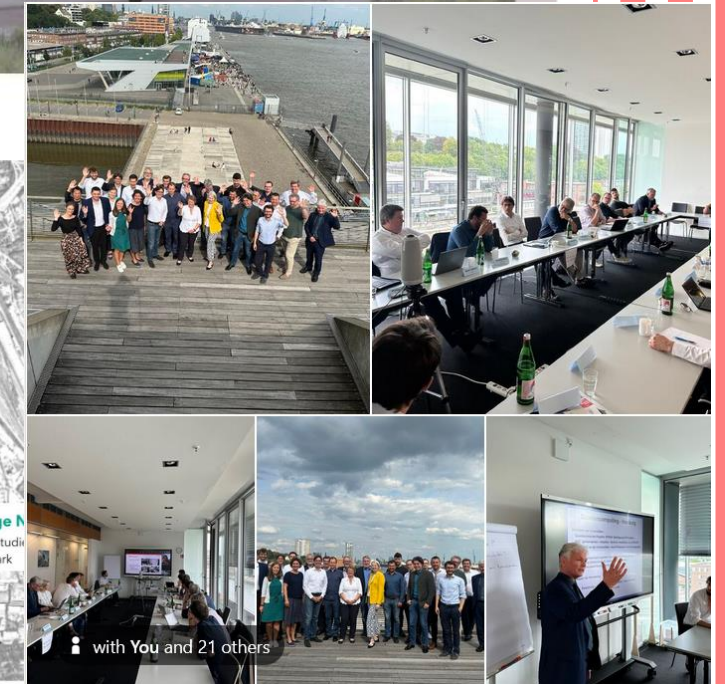Science City Bahrenfeld - Innovation Factory I+II

- Bundling of QT stakeholder offerings
- Operator concept

Abbildung: Visualisierung der „DIF 2"

Abbildung: Fläche an

Innovationspark Altona
Forschungs- und Entwicklungsstandort für innovative Unternehmen

Universität Hamburg
(und weitere Forschungsinstitute)
Forschung und Lehre. In den Instituten Chemie, Physik und z.T. Biologie

DESY
Forschungszentrum für naturwissenschaftliche Grundlagenforschung

Lebendige
Leben und studi
zum Volkspark

with You and 21 others

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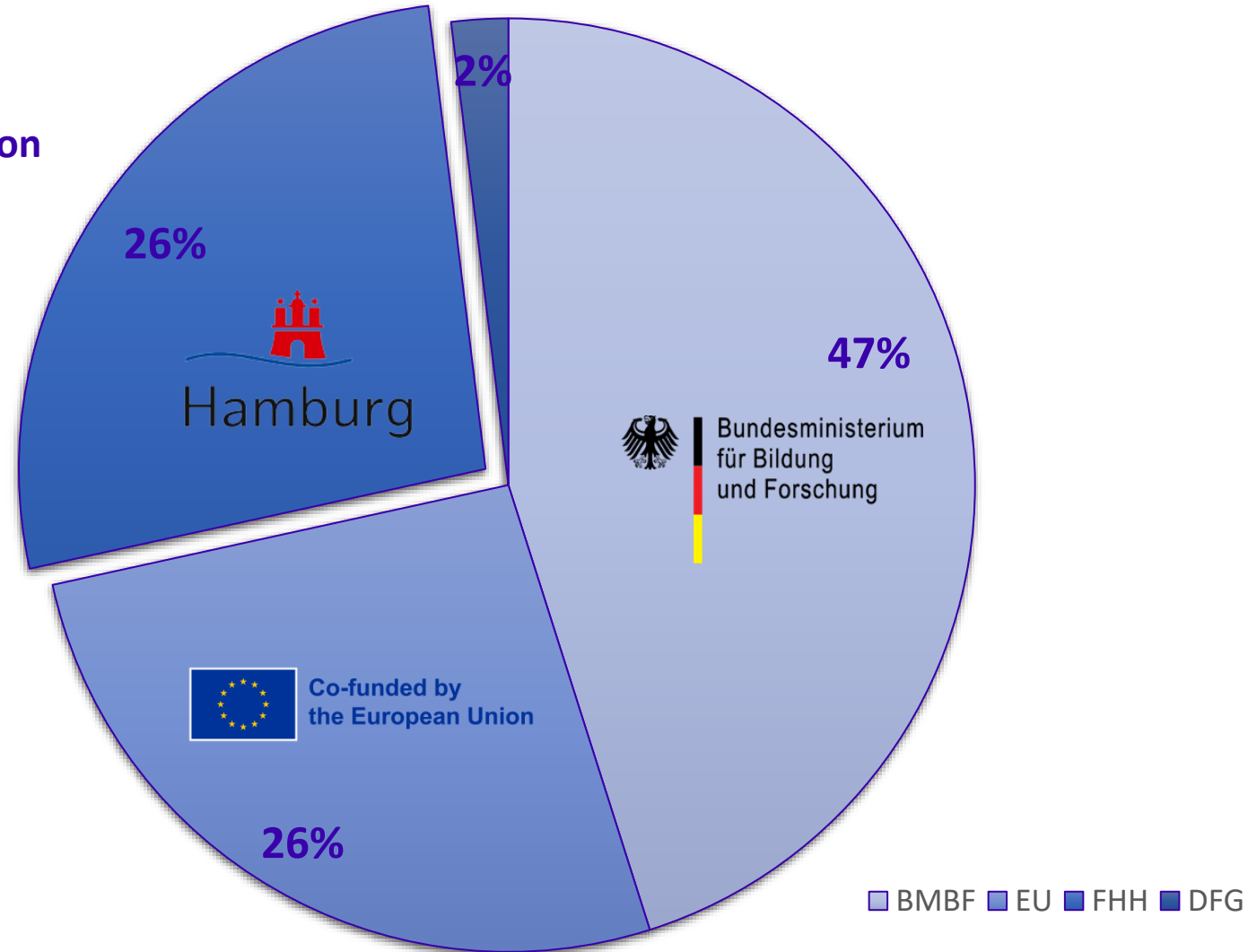**[Volume: €208.5 million]**

hqic

Funding Landscape Quantum Metropolis Hamburg

Total:
- **Funding period: 2020-2028**
- **Budget: approx. € 125 million**
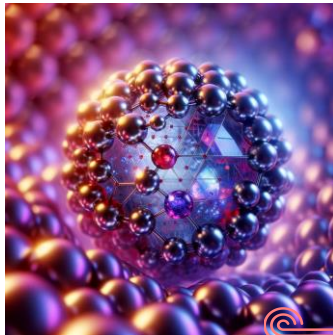- **Projects: 21**

Examples Research Overview QT in FHH

Quantum computers: exponentially fast factorization of large numbers and search in unsorted databases

over 12 projects; € 77.9 million

Quantum sensor: higher precision and sensitivity for applications in medicine, navigation,...

FLATBAND, SURQUID, QUANCER; €11.9 Mio.

Quantum communication: tap proof communication networks

Quantum HiFi; Development of practical, stable quantum communication networks with high data rates; €1.85 million; Start 07/2022

Quantum materials: new properties for technological applications through quantum effects

TIMES PhD Network; 10 universities; Application in photovoltaics, optoelectronics, superconductivity; €2.6 million; Start March 2024

Quantum Base Technologies: Quantum Hardware, Software, Simulation and Cryptography

LINOBUS (lithium tantalate waveguide) and Qusied (simulaiton many-atom tweezer cavity platforms)

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Application of exponentially fast factorization of large numbers!

Quantencomputer

Safety:
- **Encryption systems** (e.g. RSA) use prime numbers to generate secure keys.
- **Secure data transmission** (e.g. online banking) uses prime numbers for encryption.
- **Blockchain and cryptocurrencies** are based on cryptographic methods with prime numbers.
- **Digital signatures** use prime numbers to ensure the authenticity of documents.

- **Random numbers:** Prime numbers play a role in generating high-quality random numbers for security applications.

- **Network security:** Protocols such as SSL/TLS for secure web connections use prime number-based cryptography.

tagesschau — Sendung verpasst?

Startseite ▸ Wirtschaft ▸ Cyberkriminalität: Bitkom beziffert Schaden auf 206 Milliarden Euro

Bitkom legt Zahlen vor

206 Milliarden Euro Schaden durch Cyberkriminalität

Stand: 01.09.2023 13:35 Uhr

Durch Diebstahl von IT-Ausrüstung und Daten sowie durch Industriespionage und Sabotage entstehen der deutschen Wirtschaft dieses Jahr 206 Milliarden Euro Schaden. Das ergab eine Bitkom-Umfrage. Immer mehr Attacken kommen aus Russland und China.

Participating companies QT research projects in FHH

Start-Ups

HQS Quantum Simulations
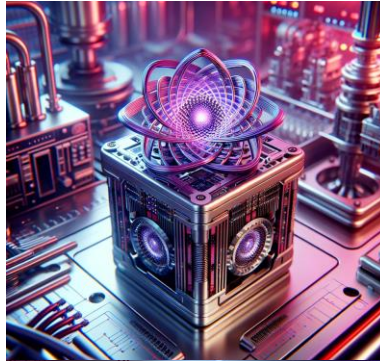
Planqc

ParityQC

IQM-Germany

Quartiq

Qudora

Single Quantum

eleQtron

Quantencomputer

Quantensensor

Large companies

Airbus Operations GmbH

BASF SE

Fujitsu

IBM Research Europe

Otto Group - Hermes

NXP

SMEs

1. Rapp OptoElectronic GmbH; 2. MicroVision; 3. Toptica Photonics AG;
4. Multiverse Computing; 5. Magnicon; 6. Schäfter+Kirchhoff

hqic

Meet us...

hqic

Hamburg Quantum Innovation Capital

Newsletter

QT-Community Service

Nichts mehr verpassen im Bereich Quantentechnologie – Wir informieren über Veranstaltungen, neue Entwicklungen in der Metropolregion und aktuelle Fortbildungsangebote.

| E-Mail Adresse | **Jetzt anmelden** |

☐ Ich habe die Datenschutzerklärung gelesen und stimme ihr zu.

www.hqic.de