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HECS 2024
GHENT BELGIUM
5-6 December

Semiconducting quantum pilot line

Kristiaan De Greve (imec), for the consortium
5 December 2024

Europe pioneering and leading in semiconducting quantum technology



ARTICLE

Received 28 Jul 2016 | Accepted 11 Oct 2016 | Published online 10 October 2016 | DOI:10.1038/s41586-021-01022-2

A CMOS

R. Maurand^{1,2}, M. A. C. M. de Vries^{1,2}, H. Bohuslavskiy^{1,2}, R. M. van der Weide^{1,2}, L. Hutin^{1,3}, S. Barraud^{1,2}, M. T. Ghemassi^{1,2}, M. Franceschi^{1,2}

First industrial CMOS qubit

Article

Universal control of a qubit quantum processor in silicon

https://doi.org/10.1038/s41586-021-01022-2 | Published online 10 October 2021 | DOI:10.1038/s41586-021-01022-2 | Received: 19 February 2021 | Accepted: 10 September 2021 | Published online: 10 October 2021 | www.nature.com/scientificdata/ | Open Access | G. J. Phillips^{1,2}, Mateusz T. Madziar^{1,2}, Sergey V. Amitonov¹, Sander L. de Snoo¹, Maximilian Russ¹, Nima Kalhor¹, Christof Fahlke¹, William I. L. Lawrie¹, Delphine Brousse²

Largest Si qubit array

nature nanotechnology

Article

Shared control of a qubit quantum processor in silicon

Received: 10 September 2021 | Accepted: 20 July 2022 | Published online: 28 August 2022 | DOI:10.1038/s41586-023-01491-3 | www.nature.com/scientificdata/ | Open Access | Francesco Borsoi¹, Nico W. Hendrickx¹, Valentin John¹, Marcel Meyer¹, Sayr Motz¹, Floor van Riggelen¹, Amir Sammak², Sander L. de Snoo¹, Giordano Scappucci¹ & Menno Veldhorst¹

Largest quantum dot array

Article

Quantum logic with spin qubits crossing the surface code threshold

https://doi.org/10.1038/s41586-021-01022-2 | Published online 10 October 2021 | DOI:10.1038/s41586-021-01022-2 | Received: 1 July 2021 | Accepted: 10 September 2021 | Published online: 10 October 2021 | www.nature.com/scientificdata/ | Open Access | Nodar Samkharadze^{1,3}, Brennan Undseth^{1,2}, Amir Sammak^{1,3}, & Lieven M. K. Vandersypen^{1,2}

Highest fidelity Si qubit

ARTICLES

https://doi.org/10.1038/s41563-021-01022-2

nature materials

Check for updates

A singlet-triplet qubit in planar Ge

Daniel Jirovec¹, Alexander M. Koenig², Philipp M. Mutter³, Giulio Tavani², Marc Botifoll⁴, Oliver Sagi¹, Frederico Martins¹, Jaime Saez-Mollej¹, Borovkov¹, Jordi Arbiol^{4,5}, Daniel Christina², Giovanni Isella² and ...

And many others



Europe's unique strength: a strong RTO ecosystem

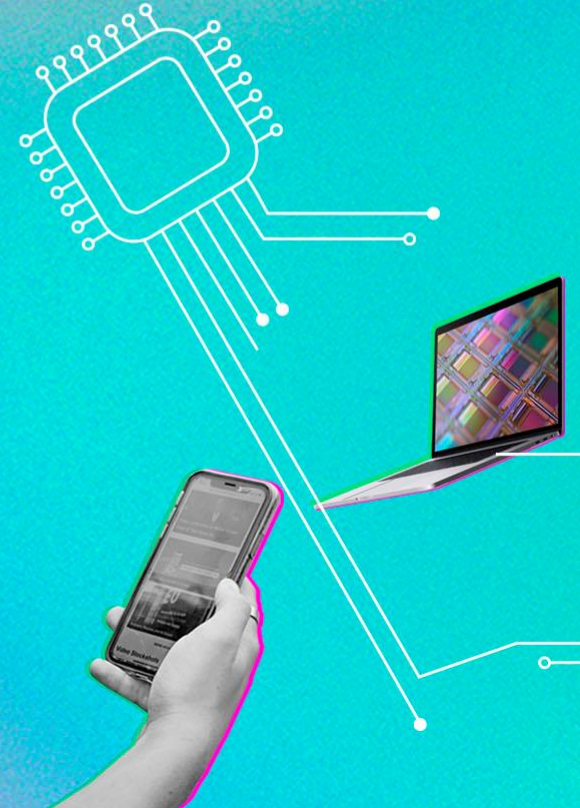
Equipped with advanced semiconductor pilot lines



**Paving the way
to Europe's
tech sovereignty**

**The European
Chips Act**

#DigitalEU #EUChipsAct



Our (im)modest proposal: higher ambition through maximum reuse

Leveraging infrastructure to invest in technology: highest TRL, MPW quantum chips

- **Focused:**
 - Silicon and germanium quantum chips
 - Strengthening Europe's leading position
- **Ambitious:**
 - Full PDK development for multi-project wafers
 - Widely accessible
 - Affordable, high-TRL technology
- **Economical & modest**
 - Infrastructure reuse
 - Investment in processes, maturity, PDKs

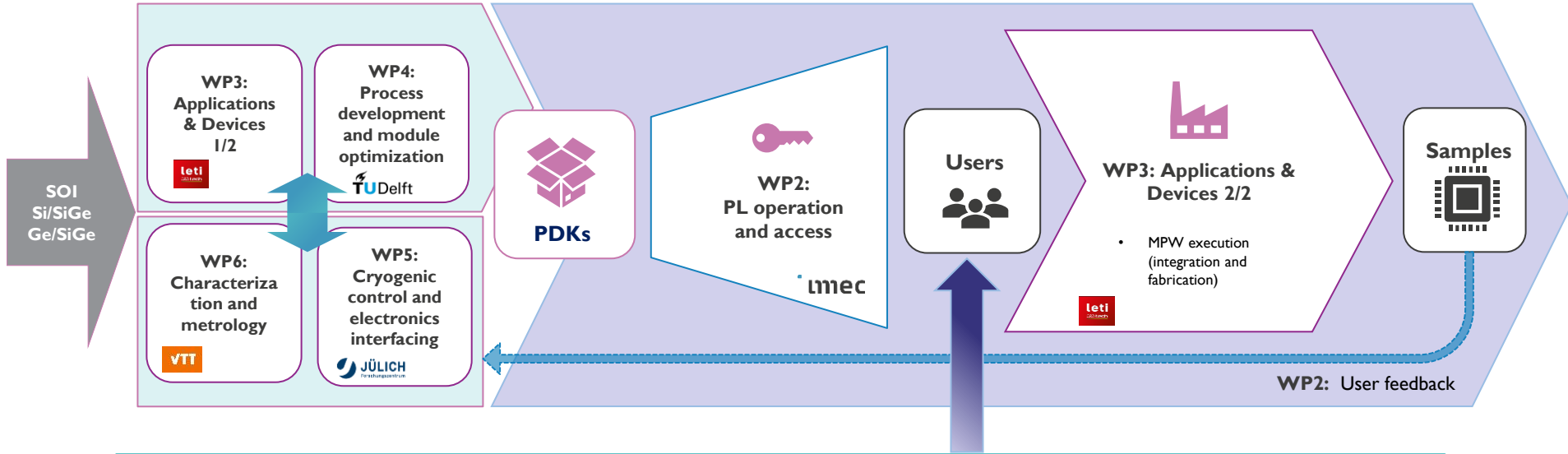


Semiconductor Pilotline for Industrial quantum NanoSystems: SPINS

imec **WPI: Management and Coordination**

Technology TRL increase

Pilot Line Access



AMIRÉS **WP7: Dissemination Communication & Exploitation**

Rationale? MPW access to high TRL technology

Expanding and enabling a broad user base to sustain the global quantum race

- **Supporting startups:**

- Sophisticated lead users to help steer PDK development
- Providing technological backbone
- Lowering barrier to entry: fabless operation



- **Broadening user base:**

- Lowering barrier to entry
- Including academic users: the future startups and idea generators

- **Ambitious:**

- Exceeds ambition of competing geopolitical approaches
 - Example: LPS Qubit Collaboratory





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embracing a better life