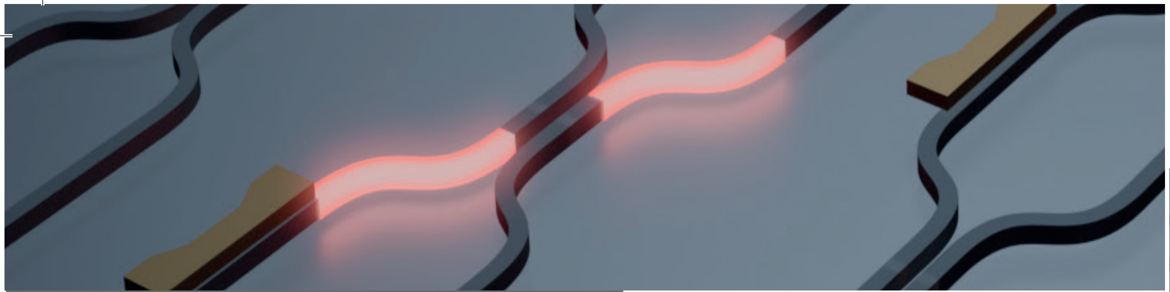


Project info

- Funding programme: Horizon Europe
- Call: HORIZON-CL4-2023-DIGITAL-EMERGING-01-CNECT
- Grant agreement no: 101135288
- Overall funding: € 10,340,741.50
- Period: 1 January 2024 – 31 December 2026

EPIQUE partners

Sapienza Università di Roma
universität wien
cnrs
CNR IFN Istituto di Fotonica e Nanotecnologie
INL International Iberian Nanotechnology Laboratory
Universität Paderborn
NASK
Single Quantum
Quandela
cea leti
ČVUT České vysoké učení technické v Praze
Universität Heidelberg Zukunft seit 1386
QUBIG
Università degli Studi Firenze
DTU
Tyndall National Institute Institiúid Náisiúnta
NKT Photonics
imec

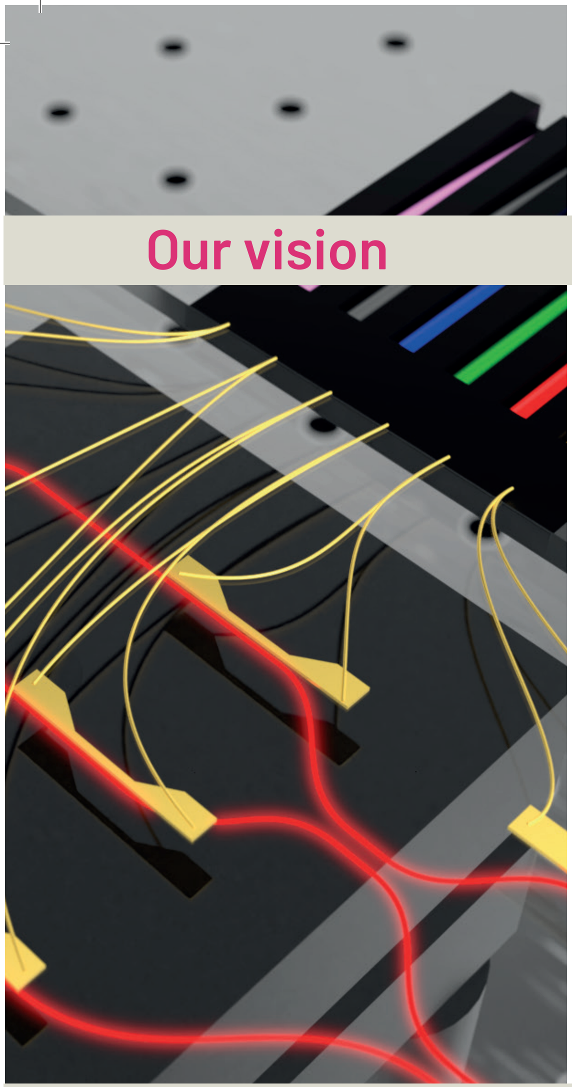
www.quantumepique.eu

EPIQUE

European Photonic Quantum Computer

Funded by the European Union

QUANTUM FLAGSHIP



Our vision

Universal and sub-universal quantum computing schemes

Measurement-based quantum computation scheme (MBQC) has been shown to represent a promising solution for an architecture capable of universal quantum computation using realistic hardware requirements. Within EPIQUE we expect to open exciting possibilities for the future of photonic quantum computing, starting with sub-universal scheme towards the implementation universal and fault tolerant MBQC.

Our mission

Towards scalable photonic quantum computing

EPIQUE is a research project funded with €10,340,000 by the European Commission under the call HORIZON-CL4-2023-DIGITAL-EMERGING-01-CNECT within the European Quantum Flagship initiative. It is carried out by 18 partners from 12 countries. Our final ambitious goal is to build a European quantum computer based on scalable photonic technology that will be made available to the European industry and academia to tap into the potential markets and applications of quantum computing. In EPIQUE, academic laboratories and deep-tech start-ups will work in synergy to assemble photonic platforms for quantum computing based on photonic cluster states and measurement induced operations.

Objectives

Three specific objectives tailored to markedly boost the performance and interoperability of the constituent technological components, to make significant impact in near-term quantum computing with real-life computational, and to make key progress towards the ultimate goal of scalable, fault-tolerant quantum computing

1. High-performance quantum light sources and photon detectors

We plan to make substantial advances to the efficiency and purity of different types of quantum state sources as well as to increase the operating speed of discrete and integrated nanowire single photon detectors and integrated homodyne detectors while maintaining or improving detection efficiencies.

2. Integrated photonic platforms and full quantum computing machines

Realization of three quantum computer demonstrators with record numbers of qubits or modes. These demonstrators will prove the feasibility of their individual architectures and point the way towards future fault-tolerant computers.

3. Design and benchmarking of near-term quantum algorithms

We will develop computing architectures tailored for photonic platforms to optimize the computational capabilities of our technologies, their robustness to noise, and demonstrate modularity for scalability towards largescale fault-tolerance. Strategies of benchmarking will be fundamental to cover all levels of the computational stack to facilitate these efforts and to validate the photonic approach to quantum computing.