



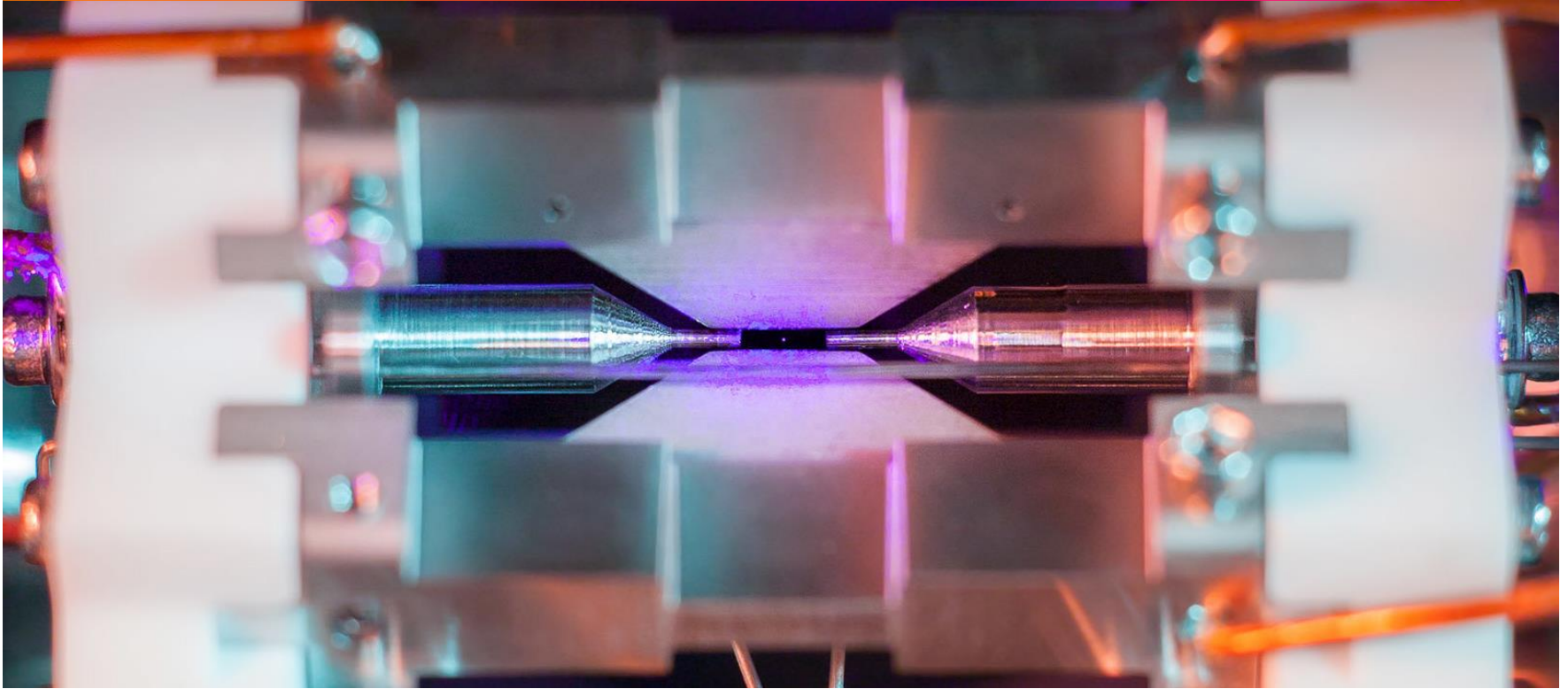
# THE EUROPEAN QUANTUM FLAGSHIP: WHERE DO WE STAND TODAY?

*Jaya Baloo*

Vice Chair of the Strategic Advisory Board  
European Quantum Flagship



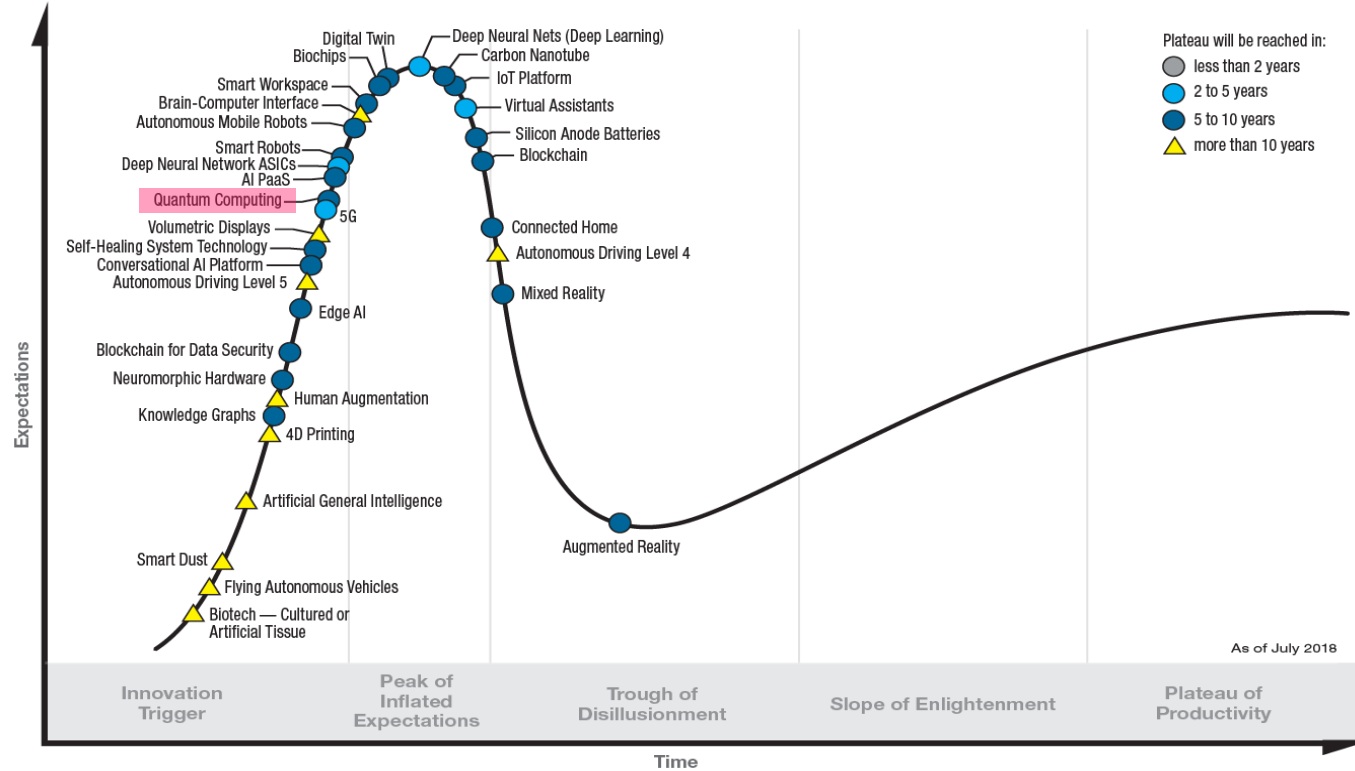
# AT THE DAWN OF THE SECOND QUANTUM REVOLUTION



*Photo: David Nadlinger, University of Oxford 2018*



# BELIEVE THE HYPE?



**Gartner Hype Cycle for Emerging Technologies: Quantum Computing Still on the Rise**

*Source: Gartner Inc. 2018*



# QUANTUM FLAGSHIP VISION



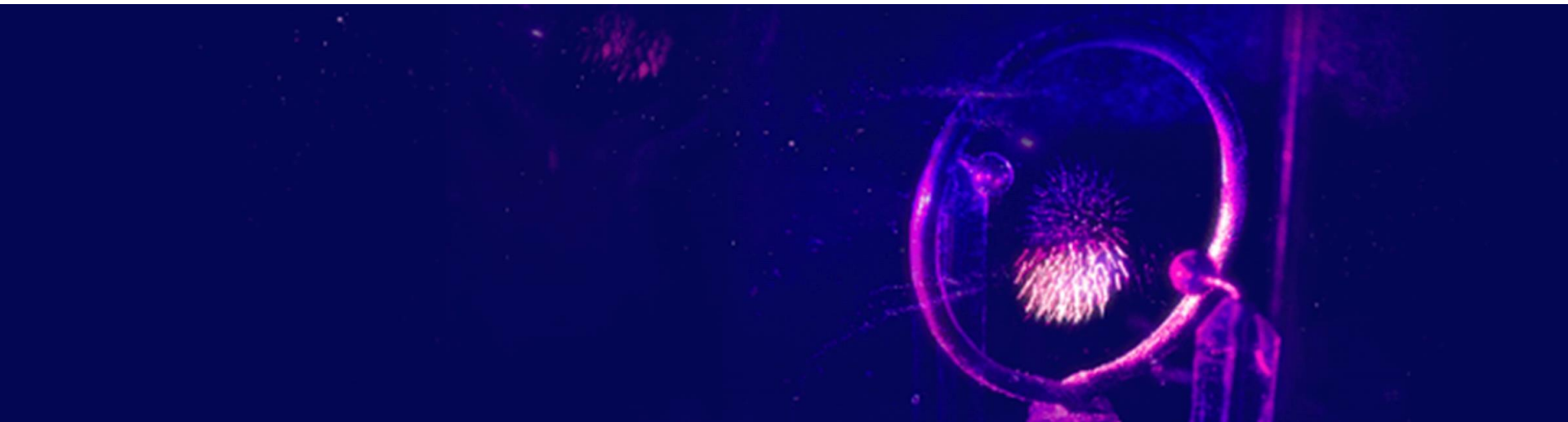
Consolidate and expand  
global scientific leadership



Kick-start a competitive  
European quantum industry



Make Europe attractive for  
innovation & investments



# TIMELINE OF THE QUANTUM FLAGSHIP

2016

## PREPARATORY STEPS

- 04/2016: Announcement in EU Cloud Initiative
- 09/2016: Set-up of the QT Flagship High Level Steering Committee
- Intermediate report (02/2017)
- Final report (09/2017)

2018

## RAMP UP PHASE

- + Flagship Coordination & Support Actions: 0.5 m€ (2017) + 2 m€ (2018)
- + Flagship Research & Innovation Actions: 130 m€ (2018)

## QUANT-ERA

- + QuantERA (01/2018): 26 countries, 36 m€ (1/3 EU)
- + QuantERA II (2020 - tbc): FET call: 10 m€

2019

## CYBERSECURITY

- + H2020 LEIT ICT QKD Testbed call (2019): 15 m€

2020

## FULL IMPLEMENTATION\*

- + Series of QT calls
- + EU Quantum Key Distribution Network

*\* pending adoption under the next multi-annual framework programme*



# OVERVIEW: RAMP-UP PHASE

4 projects

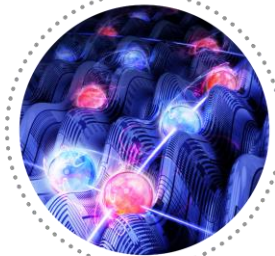


For a secure digital society and a quantum-enabled Internet



Quantum Internet: secure communication & applications

2 projects

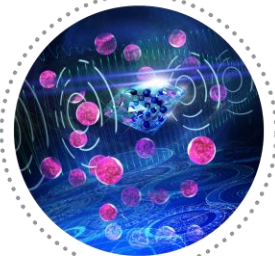


Simulating complex systems for advanced design & development



By 2021 quantum simulators 20x more precise

4 projects

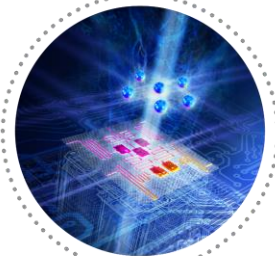


Bringing accuracy & performance to unseen levels



By 2021, sensors with resolution 1000x better

2 projects



Computing power to overcome currently unsolvable problems



By 2021, quantum computers of 50-100 qubits & first applications

7 projects



Addressing foundational challenges for new developments

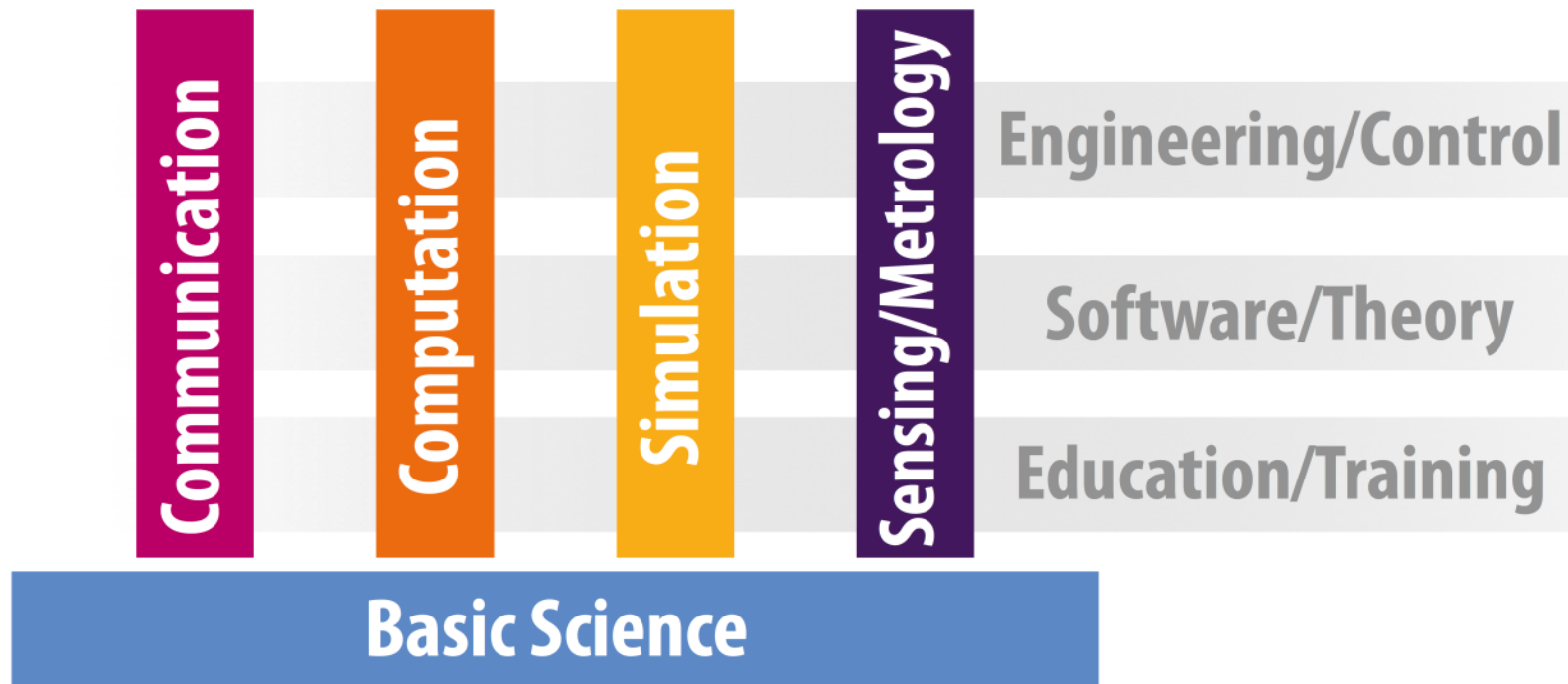


Discover & understand new fundamental quantum principles





# STRATEGIC RESEARCH AGENDA



The five key domains of the Quantum Flagship

*Based on the Final Report of the High-Level Steering Committee, July 2017*



# UPDATE: STRATEGIC RESEARCH AGENDA



**TO BE  
SUBMITTED  
UNTIL NOV 2019:**

- **SRA's short-, mid- and long-term targets**
- **platforms and thematic areas**
- **performance of the flagship**

Meeting results from the first meeting of the Strategic Advisory Board held on 23 May 2019 in Brussels  
*Appointed by the European Commission in March 2019, the SAB is the highest-level governance unit overseeing the strategy and implementation of the Quantum Flagship*





# EUROPE'S COMMITMENT: FROM VISION TO REALITY



## HORIZON EUROPE

## DIGITAL EUROPE

### QUANTERA

### QUANTUM FLAGSHIP

### QUANTUM COMMUNICATION INFRASTRUCTURE (QCI)

### QUANTUM COMPUTING INFRASTRUCTURE



Give funding support to international research projects in quantum technologies

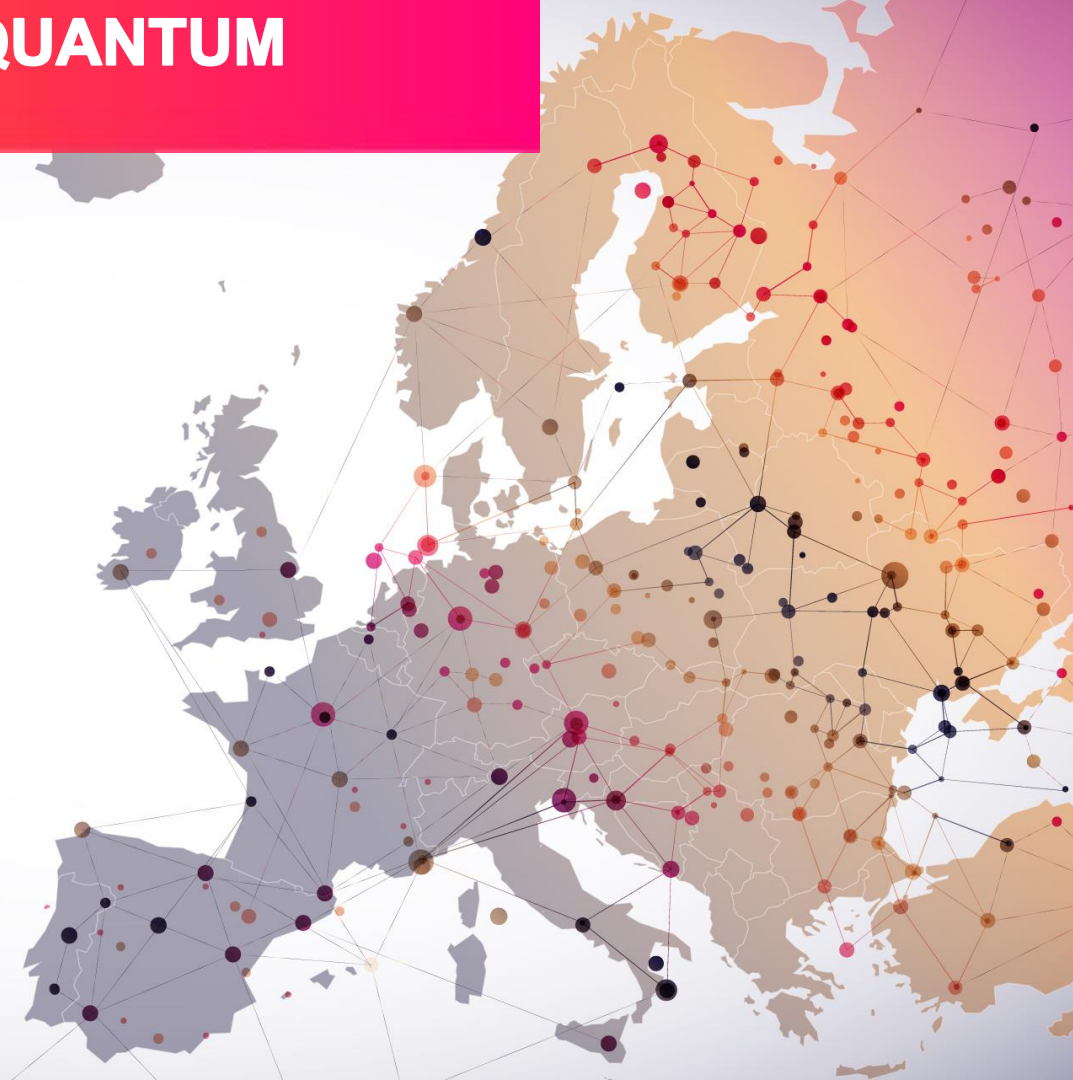
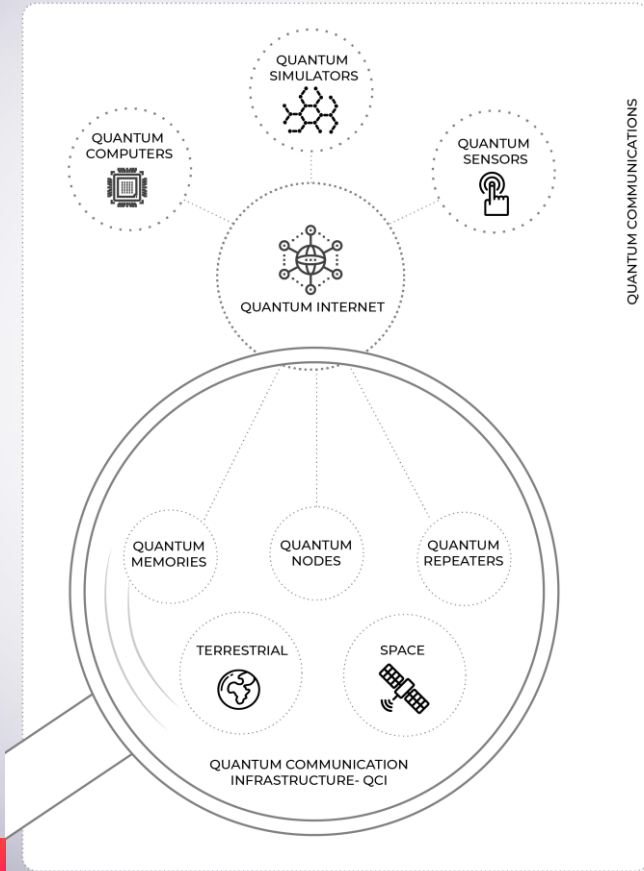
Bring quantum technologies from the lab to the market and consolidate European scientific leadership

Build and deploy in the next decade a certified secure pan-European end-to-end QCI for cybersecurity services

Build and deploy an infrastructure for big data, AI, high-performance computing, and more



# THE ULTIMATE GOAL: QUANTUM INTERNET



# INTERNATIONAL COOPERATION AND COMPETITION



Create a highly competitive and attractive European ecosystem while strengthening international collaboration, coordinated policies and IP protection around the globe



# INTERNATIONAL COOPERATION



LIGO – Laser Interferometer Gravitational-Wave Observatory, Hanford Site, USA



# INTERNATIONAL COMPETITION

The  
Economist

Quantum computing

Google claims to have demonstrated  
“quantum supremacy”

*It could be the field's Sputnik moment*



FINANCIAL TIMES

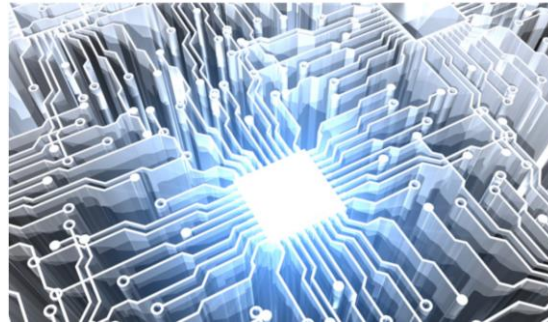
“Rivals rubbish Google’s claim of  
quantum supremacy”

physicsworld

QUANTUM COMPUTING | RESEARCH UPDATE

Google reports quantum supremacy in draft paper

24 Sep 2019 Hamish Johnston



Forbes

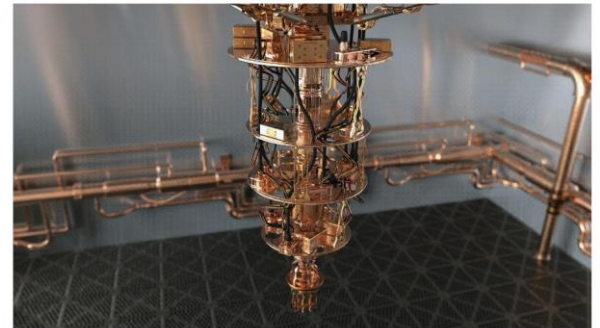
## Has Google Actually Achieved 'Quantum Supremacy' With Its New Quantum Computer?



Ethan Siegel Contributor  
Starts With A Bang Contributor Group

Science

*The Universe is out there, waiting for you to discover it.*

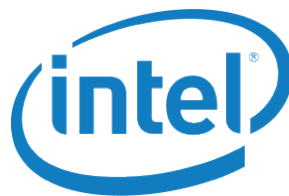


A single solution for quantum supremacy – and many interpretations





# INDUSTRY INVOLVEMENT & VALUE CREATION IN EUROPE







**Thank you for your attention!**

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