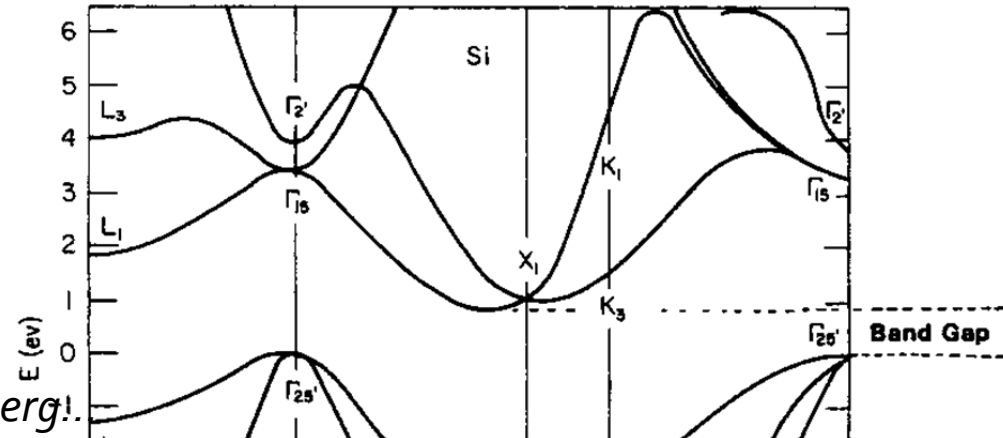




# LETI QUANTUM PLATFORM

Leti Innovation Days | June 28-29, 2017



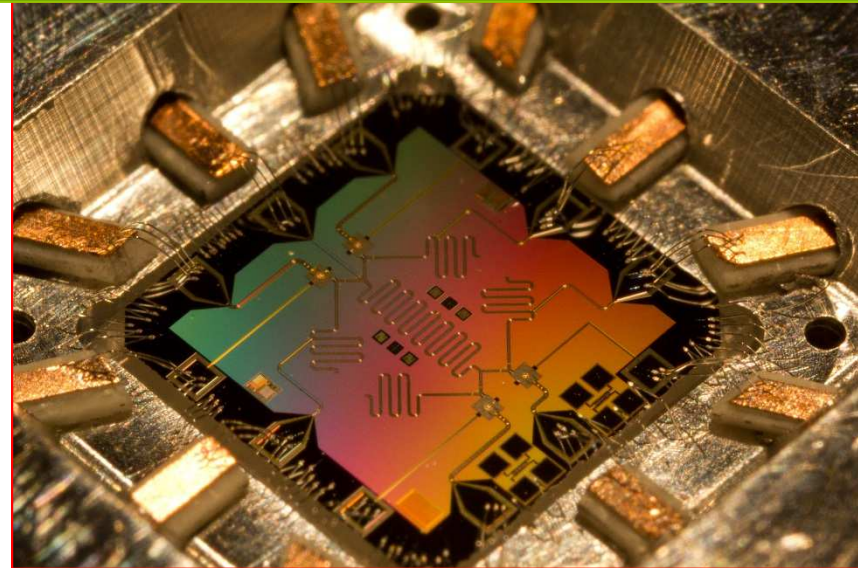


Schrödinger, Einstein, Bohr, Planck, Heisenberg!

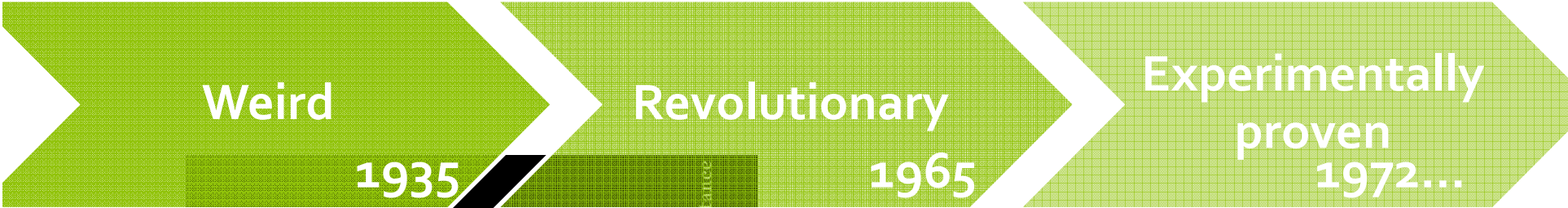
1st quantum revolution

Revolutionary concept: wave-particle duality

Structure of matter: atoms, chemical bonds



# Quantum entanglement



A graphic with the letters 'EPR' in large white font on a black background. The 'E' has 'Bell's Inequality' written above it. The 'P' has 'Correlations' written vertically to its left. The 'R' has 'Spooky Action-at-a-Distance' written vertically to its right. Between the 'P' and 'R', the words 'locality' and 'Paradox' are written vertically. Above the 'R', the words 'Hidden Variables' and 'Einstein Podolsky Rosen' are written.

Physics

Physics 8, 123 (2015)

## Viewpoint

### Closing the Door on Einstein and Bohr's Quantum Debate

Alain Aspect

Laboratoire Charles Fabry, Institut d'Optique Graduate School, CNRS, Université Paris-Saclay, Palaiseau, France

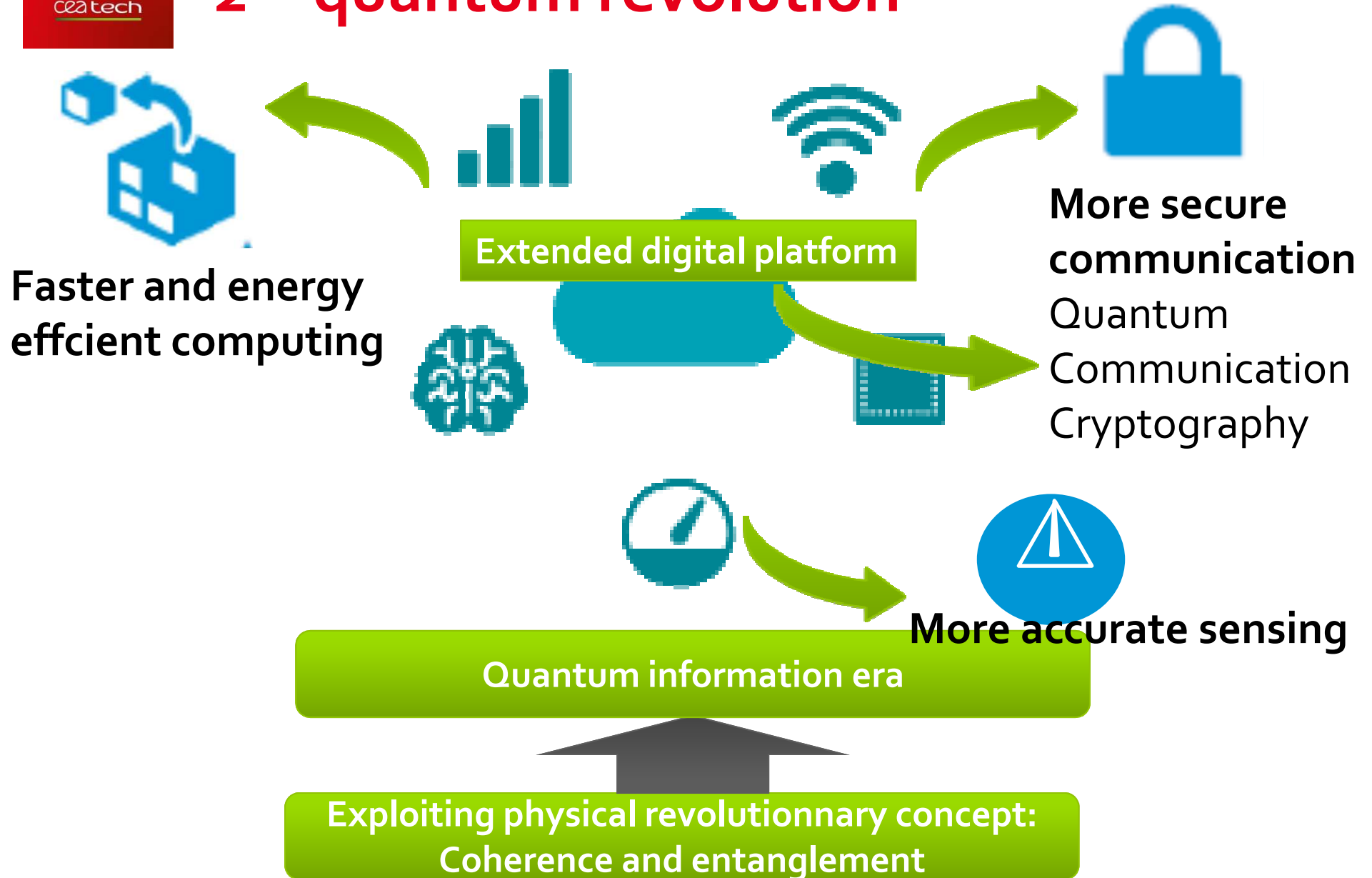
Published December 16, 2015

*By closing two loopholes at once, three experimental tests of Bell's inequalities remove any doubt that we should renounce local realism. They also open the door to new quantum information technologies.*

Subject Areas: Quantum Physics, Optics, Quantum Information



# 2<sup>nd</sup> quantum revolution





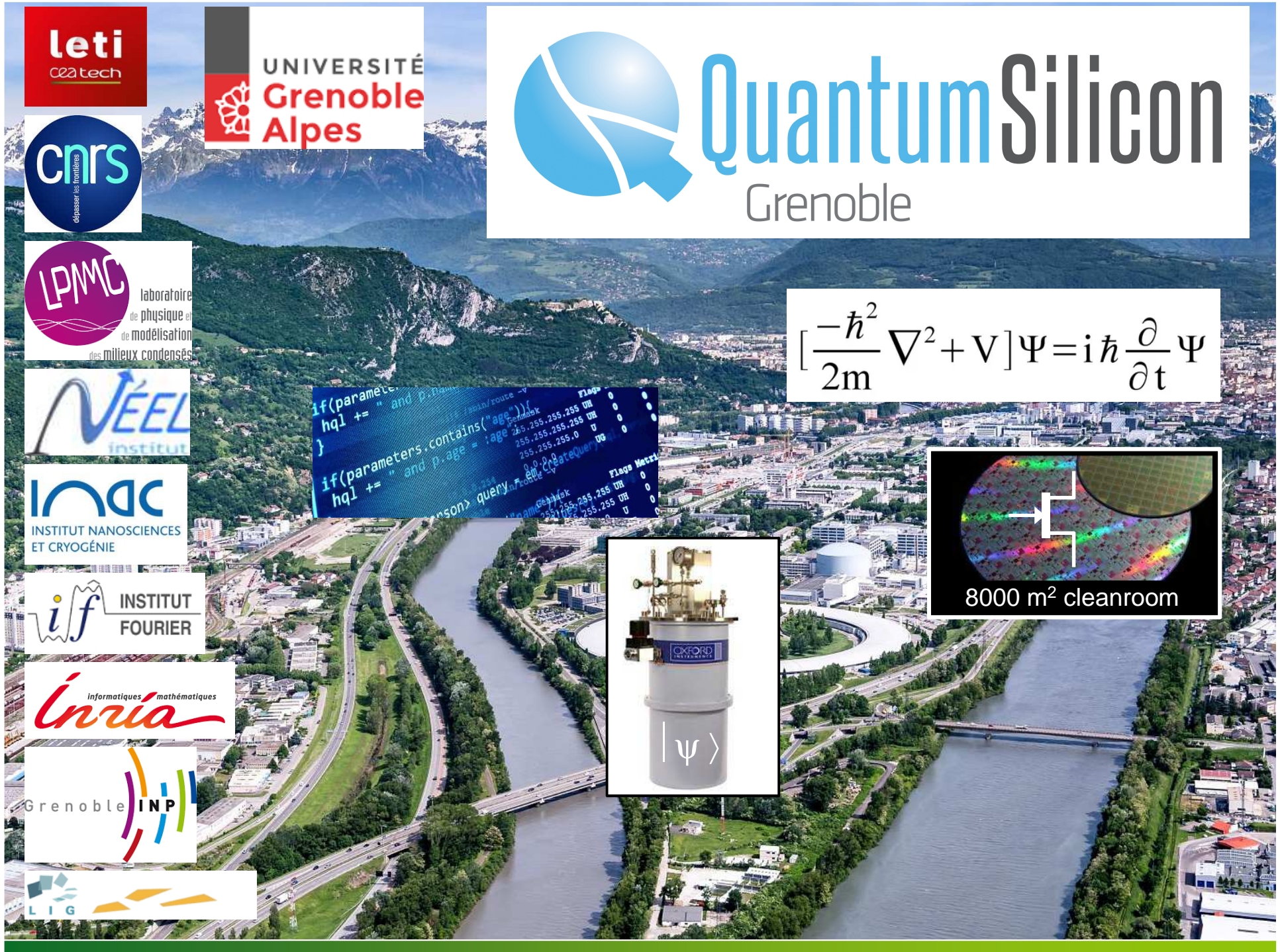
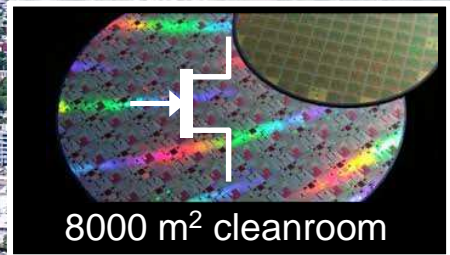



# Quantum Silicon

Grenoble



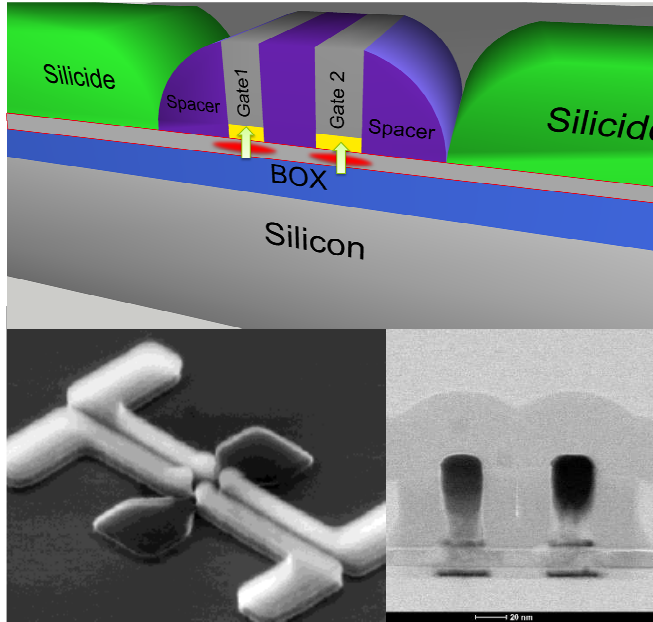
$$\left[ \frac{-\hbar^2}{2m} \nabla^2 + V \right] \Psi = i \hbar \frac{\partial}{\partial t} \Psi$$





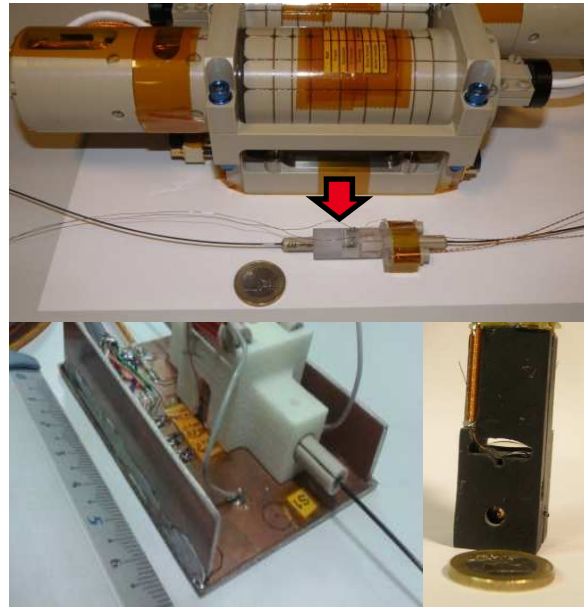


# Quantum technologies activities at Leti



Si based quantum information processing

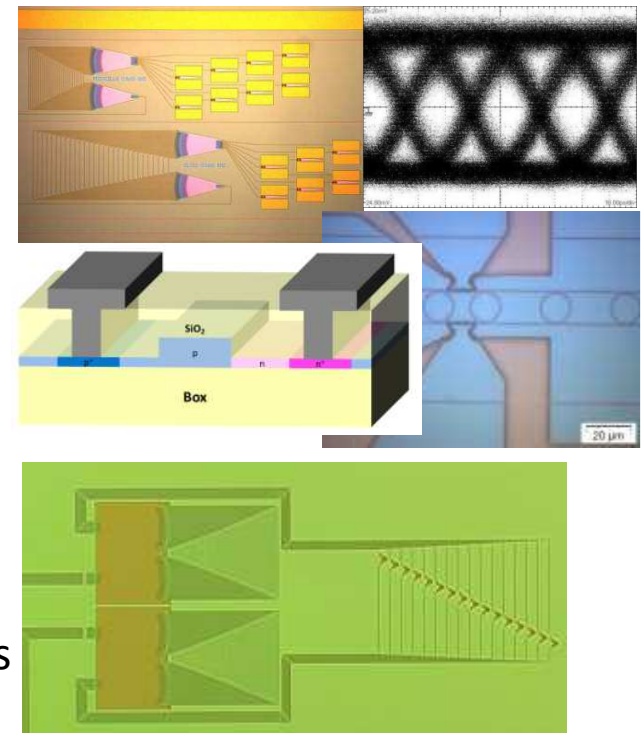
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Ultra sensitive magnetometers  
 $210 \text{ fT}/\sqrt{\text{Hz}}$

Atom based sensors

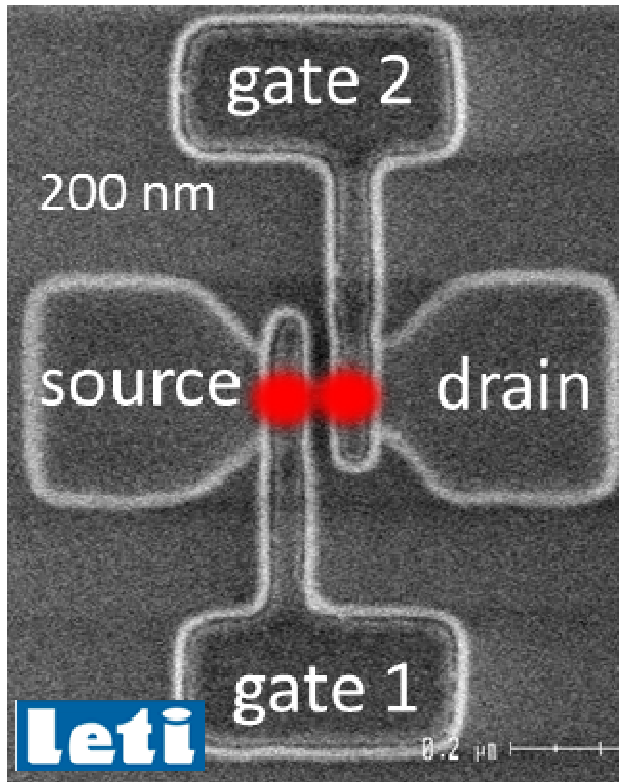
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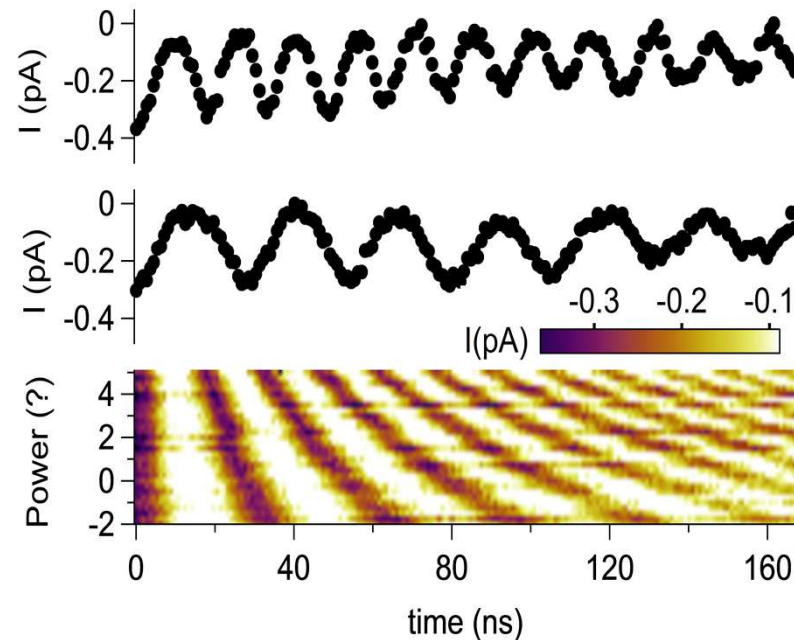
Integrated photonics

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# First 300mm Si quantum bit



## Rabi oscillations

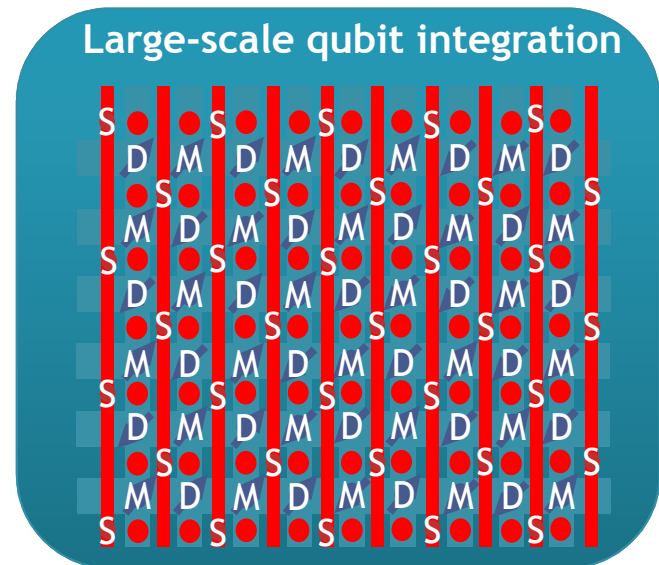
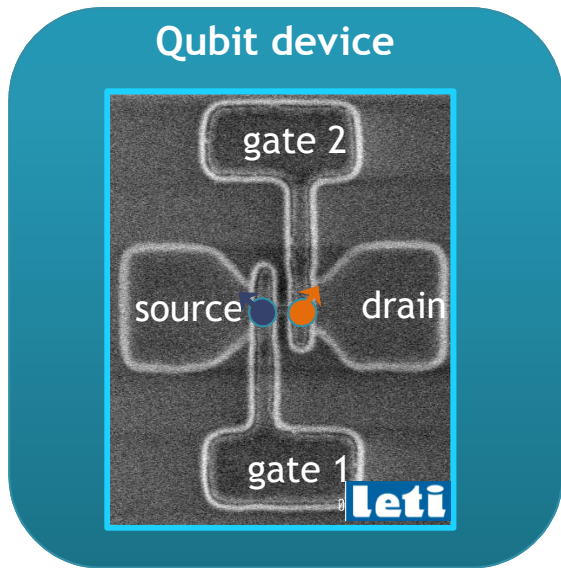
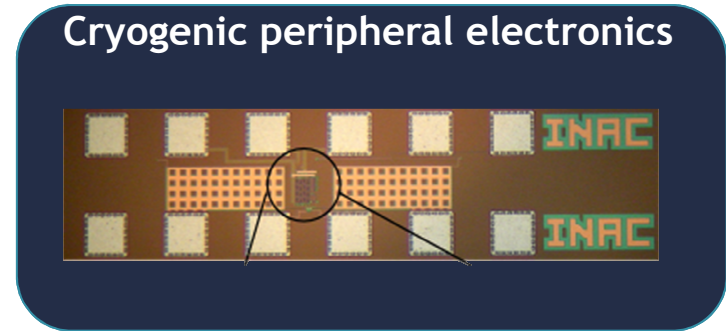
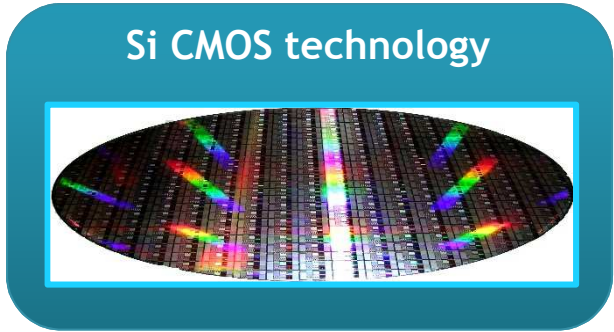


*L Hutin, VLSI 2016*

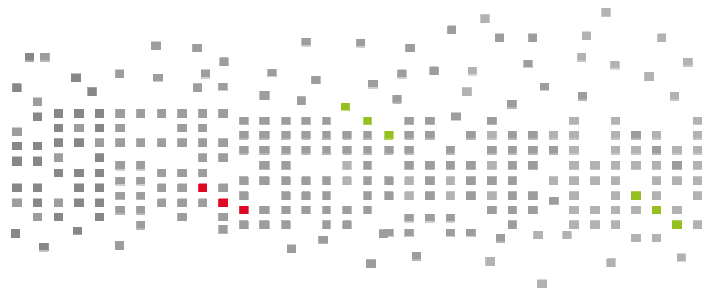
*R Maurand, Nature comm 2016*



# A CMOS platform for quantum computing







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**Leti, technology research institute**

Commissariat à l'énergie atomique et aux énergies alternatives

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