Quantum Europe: a new era of Technology

Freeke Heijman 16 March 2016
Ministry of Economic Affairs
Long term goal

*Booming European Quantum Industry*
*Strategic and technological independance*

What is needed?

*EU leadership for integrated effort on science, engineering and entrepreneurship*

Why now?

*Quantum Science has reached certain maturity level*
*Other parts of the world are speeding up*
Governments and companies are showing increased interest in quantum computing.

- **1999**: EU invests €50-75 M in quantum technologies via FET program over next 7 years.
- **2000**: EU investment.
- **2001**: SK Telecom starts R&D on quantum communication.
- **2004**: USA ARDA invests in Quantum Information Science and Technology Roadmap.
- **2005**: Microsoft starts Station Q at UC Santa Barbara.
- **2010**: Canadian government invests €78 M in quantum technologies over next 7 years.
- **Dec 2013**: UK Government invests £270 M in quantum technologies in next 5 years.
- **June 2015**: NL Government invests €135 M in QuTech Delft over next 10 years.
- **2015**: Chinese government plans major investment in quantum computing.
- **2016**: EU investment.
- **2019**: Intel invests $50 mln. in QuTech.

**Timeline Key Dates**

- **1999**: EU invests €50-75 M in quantum technologies via FET program over next 7 years.
- **2000**: EU investment.
- **2001**: SK Telecom starts R&D on quantum communication.
- **2004**: USA ARDA invests in Quantum Information Science and Technology Roadmap.
- **2005**: Microsoft starts Station Q at UC Santa Barbara.
- **2010**: Canadian government invests €78 M in quantum technologies over next 7 years.
- **Dec 2013**: UK Government invests £270 M in quantum technologies in next 5 years.
- **June 2015**: NL Government invests €135 M in QuTech Delft over next 10 years.
- **2015**: Chinese government plans major investment in quantum computing.
- **2019**: Intel invests $50 mln. in QuTech.

**Source**: Press search
~7000 researchers worldwide, estimated yearly budget ~€1.5 B

1 Combined estimated budget of EU countries
Approach

• Manifesto for strong support in stakeholder communities

• Presidency Conference to raise awareness

• Parallel approach with Commission and organized community

• Presidency note and hand-over to Slowaks
Timeline

Fall 2015: CEO roundtable, Call for European strategy
Oettinger/Kamp, 2 pager Juncker, Merkel, Hollande

• March: Quantum Manifesto for endorsement
• April: Communication European Cloud Initiative
• 6 April: STOA event European Parliament
• 17-18 May: Amsterdam Conference
• 26-27 May: Competitiveness Council
• June-June: preparatory phase
Manifesto

• Quantum Technologies are of strategic importance and will change global industries and markets
• Europe has the opportunity to lead the second quantum revolution
• Timeline with expected killer apps and technology milestones
• Call for flagship-scale initiative

PROCESS
• European team without chair
• Broad consultation
Quantum Manifesto
17-18 May Amsterdam Conference

Hand-over of Manifesto

Keynotes include:
- Commissioner Oettinger
- Mike Lazaridis
- Mike Mayberry
- Michael Bolle
- Krysta Svore
- John Martinis
- Alain Aspect
Lessons learned HPB / Graphene

- Carefully manage leadership roles of top scientists and don’t bother them with governance and administration.
- Ensure good governance with open, bottom-up processes.
- Flagship brings research communities together and exposed to one another.
- Leave room for scientific or any other form of debate.
- “Federating” the research communities takes time.
- A Flagship is not a bundle of H2020 projects.
- Manage expectations and keep communications open and transparent.