



# Perspectives on Canada-EU collaboration

*Michele Mosca*

## My past involvement in Canada-EU projects

- 2000-2003 “Quantum Algorithms and Information Processing”; H. Buhrman (co-applicants: M. Mosca & 10 others), EU 5<sup>th</sup> Framework, IST-FET
- 2003-2006 “Resources for Quantum Information”; S. Massar (co-applicants: M. Mosca & 10 others) EU 5<sup>th</sup> Framework, IST-FET
- 2005-2008, “Qubit Applications”; I. Walmsley (+34 co-applicants), EU 6th Framework, IST

## My past involvement in Canada-EU projects

- EU 6<sup>th</sup> Framework Project proposal “Development of a Global Network for Secure Communication based on Quantum Cryptography” (SECOQC), 2004-2008.
- E. Diamanti (+10 co-applicants), « Recherche fondamentale en réseaux quantiques », Agence Nationale de la Recherche, Programme Blanc International, 2010-2012
- +many other cross-Atlantic engagements (e.g. organizing Dagstuhl workshops, ETSI-IQC Quantum-Safe Workshops, etc.)

# Why bother?

- Total cash award for Canada: **\$0**
- Engage with other leading researchers working in similar and complementary topics; easier to stay in the loop, on the cutting edge, avoid duplication of effort and dissolution of successful transatlantic synergies
- Easier for EU colleagues to spend resources to collaborate with us

# Examples of some important results

- M. McKague, M. Mosca, **N. Gisin**, “**Simulating Quantum Systems Using Real Hilbert Spaces**”, Phys. Rev. Lett. 102(2), 020505, 2009. [arXiv:0810.1923v1](#)
- G. M. D’Ariano, W. van Dam, E. Ekert, C. Macchiavello, M. Mosca, “**Optimal phase estimation in quantum networks**”, J. Phys. A:Math. Theor. 40, 7971-7984, 2007. [arXiv:0706.4412v2](#)
- G. M. D’Ariano, W. van Dam, E. Ekert, C. Macchiavello, M. Mosca, “**General optimized schemes for phase estimation**”, Physical review Letters, Vol. 98(9), 090501, 2007.
- **Frederic Magniez**, Dominic Mayers, Michele Mosca, Harold Ollivier, “**Self-Testing of Quantum Circuits**”, Proceedings of the 33<sup>rd</sup> International Colloquium on Automata, Languages and Programming (ICALP’06), Venice, Italy (2006).
- P. Høyer, M. Mosca, **R. de Wolf**, “**Quantum Search on Bounded-Error Inputs**”, Proceedings of the Thirtieth International Colloquium on Automata, Languages and Programming (ICALP’03), Eindhoven, The Netherlands (2003), pp. 291-299.
- A. Ambainis, M. Mosca, A. Tapp and **R. de Wolf**, “**Private quantum channels**”, Proceedings of the 41st Annual Symposium on Foundations of Computer Science (FOCS ’00), Redondo Beach, USA, (2000), pp. 547-553.

e.g.

- **Frederic Magniez, Dominic Mayers, Michele Mosca, Harold Ollivier, “Self-Testing of Quantum Circuits”,** Proceedings of the 33<sup>rd</sup> International Colloquium on Automata, Languages and Programming (ICALP’06), Venice, Italy (2006).

**One of the first works laying out how to achieve “Device Independent” quantum information processing using entanglement.**

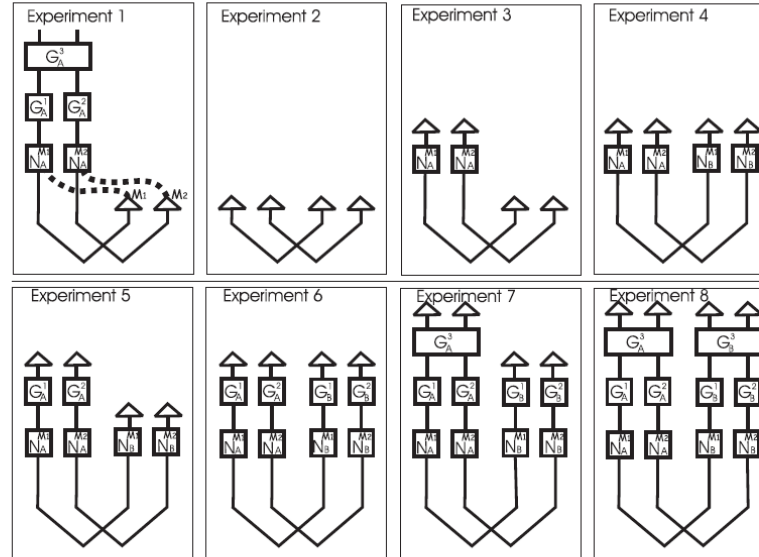


Figure 1: The different experiments to test the circuit consisting of gates  $G_A^3 G_A^2 G_A^1$  on input  $|00\rangle$ .

# *The Legend of the Canadian Matching Funds*



# Why bother?

October 29, 2020

Ottawa, Ontario

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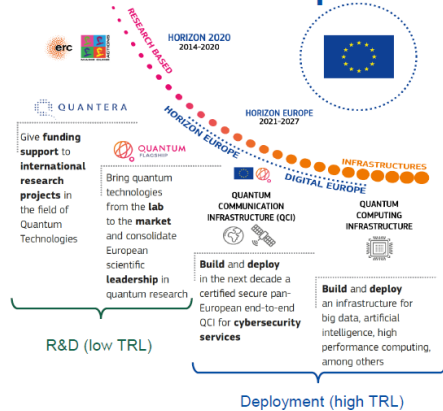
The leaders re-affirmed their determination to continue joint efforts to overcome the COVID-19 pandemic in keeping with **shared principles and values of democracy, human rights and the rule of law**, and based on the EU-Canada Strategic Partnership Agreement. They shared the commitment to take effective measures to protect health, **ensure a robust economic recovery, and build more innovative, sustainable, inclusive and resilient economies**. In this way the EU and Canada will emerge from this crisis stronger than before and in a better position to address challenges of the future.

...

Leaders highlighted the close collaboration, underpinned by **shared values**, on **ensuring a human-centric digital transformation**. They noted ongoing planning for joint research in **Quantum technologies**.



## Quantum in the EU in the period 2021-2027

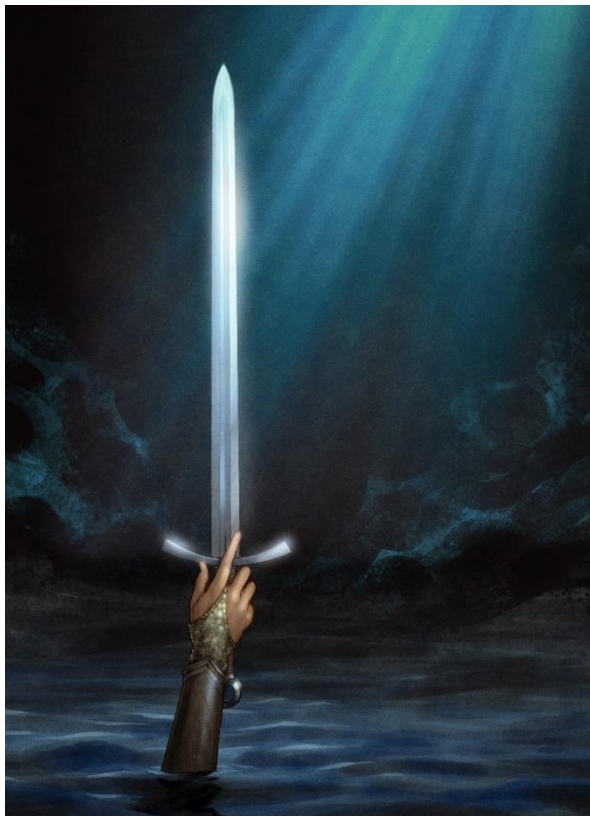


Outstanding colleagues with common vision and we can **in some cases realize it better by working closely together.**

Apply for joint projects when there is true value-add/win-win by working together.

/!\ Clearly define the benefit of EU-Canada collaboration /!\

# *Canadian Matching Funds in a single submission/evaluation process!!*



**HORIZON-CL4-2021-DIGITAL-  
EMERGING-01-23: International  
cooperation with Canada (RIA)**



EU – Canada Research and Innovation Action joint call

**single-stage submission and evaluation**



Thank You

grazzi  
efcharisto  
obrigada  
hvala  
dekuji  
paldies  
tak  
kiitos  
grazie  
köszí  
dank  
obrigado  
go raibh maith agat  
aitäh  
đakujem  
blagodarya  
tack  
Merci  
dékui  
gracias  
dzięki  
multumesc  
Danke