

EU-Canada Workshop on Quantum Research

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Overview

- 1. QT IN THE EUROPEAN UNION
- 2. EU CANADA
- **3.** HORIZON EUROPE EVALUATION





Europe's Digital Decade: Digital Compass



On 9 March 2021, the Commission presented a vision and avenues for Europe's digital transformation by 2030. This vision for the EU's digital decade evolves around four cardinal points:

Skills

ICT Specialists: 20 millions + Gender

convergence

Basic Digital Skills: min 80% of population



Secure and sustainable digital infrastructures

Connectivity: Gigabit for everyone, 5G everywhere

Cutting edge Semiconductors: double EU share in global production

Data - Edge & Cloud: 10,000 climate

Quantum



neutral highly secure edge nodes **Computing:** first computer with quantum acceleration



Digital transformation of businesses

Tech up-take: 75% of EU companies using Cloud/Al/Big Data Innovators: grow scale ups & finance to double EU Unicorns Late adopters: more than 90% of SMEs reach at least a basic level of digital intensity



Digitalisation of public services

Key Public Services: 100% online e-Health: 100% availability medical records Digital Identity: 80% citizens using digital ID

Quantum in the EU in the period 2021-2027





Deployment (high TRL)

The Quantum Flagship 2018-2021



EU – Canada Collaboration

- Long tradition of EU-Canada Collaboration
- Both are at the forefront of S&T developments
- Both have programmes focusing on long-term objectives
- Successful EU-Canada institutional & scientific dialog

Expectated Outcomes

- Make progress in the foundations of quantum S&T
- Benefit from synergies and complementary competencies
- Identify mutual benefits and achieve common targets to reach within the next decade

 \rightarrow EU – Canada joint call





EU – Canada Research and Innovation Action joint call

| CONDITION | SPECIFIC CONDITION |
|---|--|
| Indicative opening of the Call | May-June 2021 |
| Indicative deadline of the Call | 8 September 2021 |
| Expected (EU+Canada) contribution per project | EUR 2.5 million (this does not preclude submission and selection of a proposal requesting different amounts) |
| Expected duration of projects | 36 months (this does not preclude submission and selection of a proposal requesting different durations) |
| Indicative EU budget | Indicative EU budget EUR 4.00 million (CAD 6.00 million) – Support EU beneficiaries |
| Indicative Canada budget (NSERC) | Indicative Canada budget EUR 4.00 million (CAD 6.00 million) – Support Canada beneficiaries |
| Type of Action | Research and Innovation Actions, single-stage submission and evaluation |
| Technology Readiness Level | TRL 1-2 to TRL 2-3, basic science |





Scope of Joint EU – Canada projects

✓ Address a mix of quantum technology challenges in the areas of EU – Canada interest







Identify the *added value and/or mutual benefit* for both EU and Canadian beneficiaries (including the integration of different aspects like physics, engineering, computer science, theory, algorithms, software, manufacturing, control, infrastructures, etc.)





Technological and societal challenges to address (1 or more)



Quantum computing and simulation

- Co-design of hardware and software to accelerate applications
- Seamless interoperable software-to-hardware stack that can apply over multiple platforms
- Theoretical and computer science foundations of quantum algorithms and architectures ٠

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





Technological and societal challenges to address (1 or more)



Quantum communication

- Privacy and security concepts, proofs and applications, including QKD (quantum key distribution) and beyond
- Device independent protocols, quantum network/repeater protocols, including architectures and network stack
- Development of satellite and space-based hardware, and certification/verification of states and correlations

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





Technological and societal challenges to address (1 or more)



Quantum Sensing and Metrology

Application-specific quantum sensor development covering:

- Device fabrication, characterisation, e.g. for magnetometry, prospection, imaging, navigation, biomedical
- Theoretical research optimising simple sensors, control, as well as advanced approaches (use of entanglement and error correction).

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



Who is eligible for EU funding?

EU COUNTRIES

- Member States (MS) including their outermost regions.
- The Overseas Countries and Territories (OCTs) linked to the MS.

NON-EU COUNTRIES

- Countries associated to Horizon Europe (AC).
- Low and middle income countries: See <u>HE</u>
 <u>Programme Guide</u>.

SPECIFIC CASES

- Affiliated entities established in countries eligible for funding.
- EU bodies
- International organisations (IO):
 - International European research organisations are eligible for funding.
 - Other IO are not eligible (only exceptionally if participation is essential)
 - IO in a MS or AC are eligible for funding for Training and mobility actions and when announced in the call conditions.
- Minimum number of partners as set out in the call conditions (at least one independent legal entity established in a MS, and, at least two other independent legal entities established either in a MS or AC).
- Legal entities: Universities, research centers, industry, SMEs ...



Who is eligible for Canada funding?

See NSERC presentation (Canada researchers must meet NSERC's eligibility criteria)



Standard EU evaluation process





Research and innovation action (RIA)

Activities to establish new knowledge or to explore the feasibility of a new or improved technology, product, process, service or solution.

This may include basic and applied research, technology development and integration, testing, demonstration and validation of a small-scale prototype in a laboratory or simulated environment.

EXCELLENCE

- Clarity and pertinence of the project's objectives, and the extent to which the proposed work is ambitious, and goes beyond the state-of-the-art.
- Soundness of the proposed methodology, including the underlying concepts, models, assumptions, inter-disciplinary approaches, appropriate consideration of the gender dimension in research and innovation content, and the quality of open science practices including sharing and management of research outputs and engagement of citizens, civil society and end users where appropriate.

IMPACT

- Credibility of the pathways to achieve the expected outcomes and impacts specified in the work programme, and the likely scale and significance of the contributions due to the project.
- Suitability and quality of the measures to maximize expected outcomes and impacts, as set out in the dissemination and exploitation plan, including communication activities.

QUALITY AND EFFICIENCY OF THE IMPLEMENTATION

- Quality and effectiveness of the work plan, assessment of risks, and appropriateness of the effort assigned to work packages, and the resources overall.
- Capacity and role of each participant, and extent to which the consortium as a whole brings together the necessary expertise.



For more information





https://ec.europa.eu/digital-single-market/en/quantum-technologies



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