

QuantERA Call 2019 Pre-announcement

QuantERA is a consortium of national/regional funding organisations supporting research in Quantum Technologies. QuantERA is itself supported by the European Union's Future and Emerging Technologies scheme (FET).

These funding organisations jointly support multilateral research projects selected in the framework of QuantERA, with the potential to initiate or foster new lines of quantum technologies through collaborations exploring advanced multidisciplinary science and/or cutting-edge engineering.

QuantERA will launch in November 2018 a joint call for transnational research proposal supporting the topics of Quantum Technologies (named **Call 2019**).

Anticipated deadline for short and full proposals (joint submission): 18th of February 2019

The present *Call 2019 Pre-announcement* gives an overview of the QuantERA Call 2019 research themes and tentative timeline.

Researchers are encouraged to start discussing possible projects with prospective partners. A Partner Search Tool is available at <https://ncn.gov.pl/partners/quantera2/> and a networking event is planned for [the 5th of December 2018 in Vienna during the ICT 2018 Conference](#).

Please note that this pre-announcement is for information purposes only. It does not create any obligation for the QuantERA consortium nor for any of the participating national/regional research funding organizations. The official *Call 2019 Announcement*, to be published in November 2018, shall prevail.

Call Information

French National Research Agency (ANR), France

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Call 2019 Key Facts & Figures

Scope: Quantum Technologies

Maximum call budget: ca. €20 M

The project consortia must have a minimum of 3 eligible partners requesting funding in at least 3 of the following countries:

International consortium: Austria, Belgium, Bulgaria, Croatia, Czech Republic, Denmark, France, Germany, Greece, Hungary, Israel, Italy, Latvia, Lithuania, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Standard consortium size: Three to six partners

Short and full proposals are evaluated based on criteria of Evaluation: *Excellence, Impact, and Quality and efficiency of the implementation*

National/Regional eligibility for funding: Each partner must fulfil the conditions of the national/regional funding organisation (to be described in the Call Announcement annex)

Tentative Timeline

November 2018 Call publication

18th of February 2019, 17:00 CET **Deadline for short and full proposals submission**

End of April 2019 Notification of selected short proposals

September 2019 Notification of selected full proposals

Fall 2019 Start of funded projects

Participating Countries

The list of countries and funding organisations which have shown preliminary interest in participating in the Call 2019 is provided below.

Nb	Country	Institution	Contact Person
1	Austria	FFG	fabienne.eder@ffg.at; peter.kerschl@ffg.at
2	Austria	FWF	stefan.uttenthaler@fwf.ac.at
3	Belgium	FNRS	florence.quist@frs-fnrs.be; joel.groeneveld@frs-fnrs.be
4	Bulgaria	BNSF	aleksandrova@mon.bg
5	Croatia	HRZZ	kristinak@hrzz.hr
6	Czech Republic	MEYS	monika.kocmanova@msmt.cz
7	Denmark	IFD	michael.hansen@innofond.dk
8	France	ANR	jerome.lasne@anr.fr
9	Germany	BMBF, VDI/TZ	krug@vdi.de
10	Greece	GSRT	mgkizeli@gsrt.gr
11	Hungary	NKFIH	edina.nemeth@nkfih.gov.hu
12	Israel	InnovationAuth	dan@iserd.org.il
13	Italy	CNR	info.quantera@cnr.it
14	Latvia	VIAA	juris.balodis@viaa.gov.lv
15	Lithuania	RCL	saulius.marcinkonis@lmt.lt
16	Norway	RCN	psma@rcn.no
17	Poland	NCN	marlena.wosiak@ncn.gov.pl
18	Poland	NCBR	krystyna.maciejko@ncbr.gov.pl
19	Portugal	FCT	rui.durao@fct.pt
20	Romania	UEFISCDI	nicoleta.dumitrache@uefiscdi.ro
21	Slovakia	SAS	barancik@up.upsav.sk
22	Slovenia	MIZS	andrej.ograjensek@gov.si
23	Spain	AEI	era-ict@aei.gob.es
24	Sweden	VR	tomas.andersson@vr.se
25	Switzerland	SNSF	georges.klein@snf.ch
26	Turkey	TUBITAK	ncpfet@tubitak.gov.tr; ncpict@tubitak.gov.tr
27	United Kingdom	UKRI	wendy.carr@epsrc.ukri.org

Research Targeted in the Call

The QuantERA consortium has created a common funding instrument to support European research consortia that engage in long-term research in the area of Quantum Technologies.

Through this instrument, the national/regional funding organisations of the QuantERA consortium contribute to the Quantum Flagship agenda¹. By launching joint European calls for research projects, they can support more diverse research communities, who are able to tackle the most challenging and novel research directions.

QuantERA projects should be of a FET-like nature² and contribute to the development of the European research and innovation in Quantum Technologies. The transformative research done in QuantERA should explore collaborative advanced interdisciplinary science and/or cutting-edge engineering with the potential to initiate or foster new lines of quantum technologies and help Europe grasp leadership early on in promising future technology areas.

To spread research excellence throughout Europe, QuantERA projects are encouraged to include partners from the widening countries participating in the call: Bulgaria, Croatia, Czech Republic, Hungary, Latvia, Lithuania, Poland, Portugal, Romania, Slovakia, Slovenia, and Turkey.

To build leading innovation capacity across Europe and connect with industry, QuantERA projects are encouraged to involve key actors that can make a difference in the future, for example excellent young researchers, ambitious high-tech SMEs, etc.

Target Outcomes

Funded projects are expected to address one or more of the following areas:

1. Quantum communication

Methods/tools/materials/strategies to deal with the issues of distance, reliability, efficiency, robustness and security in quantum communication; novel protocols for multipartite quantum communication; quantum memory and quantum repeater concepts.

Novel photonic sources for quantum information and quantum communication, coherent transduction of quantum states between different physical systems; integrated quantum photonics; quantum communication embedded in optical telecommunications systems; other communication protocols with functionality enhanced by quantum effects.

Methods for quantum communications in space, between satellites and Earth.

2. Quantum simulation

Platforms and materials for quantum simulation; development of new measurement and control techniques and of strategies for the verification of quantum simulations.

Application of quantum simulations to condensed matter, chemistry, thermodynamics, biology, high-energy physics, quantum field theories, quantum gravity, cosmology and other fields.

¹ See Strategic Research Agenda of the European Quantum Technology community at <https://tinyurl.com/QT-HLSC-report>

² See 'FET Gatekeepers' p. 7 at https://ec.europa.eu/research/participants/data/ref/h2020/wp/2018-2020/main/h2020-wp1820-fet_en.pdf

3. Quantum computation

Development of devices to realize multiqubit algorithms; demonstration and optimization of error correction codes; interfaces between quantum computers and communication systems.

Development of novel quantum algorithms; demonstration of quantum speed-up; new architectures for quantum computation.

4. Quantum information sciences

Novel sources of non-classical states and methods to engineer such states. Development of device-independent quantum information processing. Methods for the reconstruction and estimation of complex quantum states or channels and certification of their properties. Development of resource theory for quantum information. Study of topological systems for quantum information purposes. Understanding and control of open quantum systems; development of methods to confine dynamics in controllable decoherence-free subspaces. Study of thermodynamics processes at the quantum scale.

Novel ideas and applications in quantum science and technologies, based on e.g. superposition and entanglement, as means to achieve new or radically enhanced functionalities.

5. Quantum metrology sensing and imaging

Use of quantum properties for time and frequency standards, light-based calibration and measurement, gravimetry, magnetometry, accelerometry, and other applications. Development of detection schemes that are optimised with respect to extracting relevant information from physical systems; novel solutions for quantum imaging and ranging. Implementation of micro- and nano-quantum sensors, for instance for quantum limited sensitivity in the measurement of magnetic fields at the nanoscale. Extension of the reach of quantum sensing and metrology to other fields of science including e.g. the prospects of offering new medical diagnostic tools.

Expected Impacts

Funded projects are expected to significantly advance the state-of-the-art of quantum sciences and technologies³ by achieving one or more of the following targets:

- Develop a deeper fundamental and practical understanding of systems and protocols for manipulating and exploiting quantum information;
- Enhance the robustness and scalability of quantum information technologies in the presence of environmental decoherence, hence facilitating their real-world deployment;
- Develop reliable technologies for the different components of quantum architectures;
- Identify new opportunities and applications fostered through quantum technologies, and the possible ways to transfer these technologies from laboratories to industries;
- Enhance interdisciplinarity in crossing traditional boundaries between disciplines in order to enlarge the community involved in tackling these new challenges;
- Spread excellence throughout Europe by involving partners from the widening countries

³ QuantERA projects shall not duplicate research funded as part of the projects of the 1st QuantERA call and the projects of the EC Quantum Flagship call.

- Build leading innovation capacity across Europe by involvement of key actors that can make a difference in the future, for example excellent young researchers, ambitious high-tech SMEs or first-time participants.

QuantERA Programme Coordination

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