QUANTERA
ERA-NET Cofund in Quantum Technologies

QuantERA Call 2017 Pre-announcement

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

The funding organisations jointly support European 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 January 2017 a joint transnational call for research proposals in Quantum Information and Communication Sciences and Technologies (named **Call 2017**).

Anticipated deadline for pre-proposals: 15th of March 2017

The present *Call 2017 Pre-announcement* gives an overview of the QuantERA Call 2017 research themes and tentative timeline.

Researchers are encouraged to start discussing possible projects with prospective partners. A Partner Search Tool is available at www.quantera.eu, and a networking event is planned for the 16th of February 2017 in Malta.

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 2017 Announcement*, to be published in January 2017, shall prevail.

Call Information

French National Research Agency (ANR), France

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Call 2017 Key Facts & Figures

Scope:	Quantum Information and Communication Sciences and Technologies (Q-ICST)
Maximum call budget:	34 M€
International consortium:	The project consortia must have a minimum of 3 partners requesting funding in at least 3 of the following countries: AT, BE, BG, CH, CZ, DE, DK, ES, FI, FR, GR, HU, IE, IL, IT, LV, NL, NO, PL, PT, RO, SK, SE, SI, TR, UK
Standard consortium size:	Three to six partners
Evaluation:	Pre- and full proposals are evaluated based on criteria of *Excellence*, *Impact*, and *Quality and efficiency of the implementation*
National/Regional eligibility for funding:	Each partner must fulfil the conditions of the national/regional research funding organisation (to be described in the Call Announcement annex)

Tentative Timeline

January 2017	Call publication
15th of March 2017, 17:00 CET	**Deadline for pre-proposal submission**
Early May 2017	Notification of accepted pre-proposals to submit a full proposal
30th of June 2017, 17:00 CET	**Deadline for full proposal submission**
October 2017	Notification of accepted proposals
Early 2018	Start date for accepted projects

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Participating Countries

The list of countries and funding organisations which have shown preliminary interest in participating in the Call 2017 is provided below.

Nb	Country	Institution	Contact Person
1	Austria	FWF	stefan.uttenthaler@fwf.ac.at
2	Belgium	FNRS	florence.quist@frs-fnrs.be; joel.groeneveld@frs-fnrs.be
3	Belgium	FWO	alain.deleener@fwo.be; eranet@fwo.be
4	Bulgaria	NBSF	ohgv@chem.uni-sofia.bg
5	Czech Republic	MEYS	monika.kocmanova@msmt.cz
6	Denmark	IFD	michael.hansen@innofond.dk
7	Finland	AKA	jukka.tanskanen@aka.fi
8	France	ANR	mathieu.girerd@anr.fr
9	Germany	BMBF, VDI/TZ	krug@vdi.de
10	Greece	GSRT	mkoutr@gsrt.gr
11	Hungary	NKFIH	edina.nemeth@nkfih.gov.hu
12	Ireland	SFI	h2020@sfi.ie
13	Israel	MATIMOP	hadas@iserd.org.il
14	Italy	MIUR	giorgio.carpino@miur.it; aldo.covello@miur.it
15	Italy	CNR	info.quantera@cnr.it
16	Latvia	VIAA	juris.balodis@viaa.gov.lv
17	The Netherlands	FOM	michiel.van.den.hout@fom.nl; m.vandenhout@nwo.nl
18	Norway	RCN	psma@rcn.no
19	Poland	NCN	marlena.wosiak@ncn.gov.pl
20	Poland	NCBR	michal.chomczyk@ncbr.gov.pl
21	Portugal	FCT	rui.durao@fct.pt
22	Romania	UEFISCDI	nicoleta.dumitrache@uefiscdi.ro
23	Slovakia	SAS	barancik@up.upsav.sk
24	Slovenia	MIZS	andrej.ograjensek@gov.si
25	Spain	MINECO	era-ict@mineco.es
26	Sweden	VR	tomas.andersson@vr.se
27	Switzerland	SNSF	quantera@snf.ch
28	Turkey	TUBITAK	ncpict@tubitak.gov.tr
29	United Kingdom	EPSRC	richard.gunn@epsrc.ac.uk

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 Information and Communication Sciences and Technologies (Q-ICST). Through this instrument, the national/regional research funding organisations of the QuantERA consortium support and join the European Union's Future and Emerging Technologies (FET) agenda. By coordinating their efforts, they can support more diverse research communities, who are able to tackle the most challenging and novel research directions.

Submitted proposals should be of a FET-like nature[1] and contribute to the development of the European research. The transformative research done in QuantERA should explore collaborative advanced multidisciplinary 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 those promising future technology areas.

QuantERA aims at spreading research excellence in the whole European Research Area. Therefore, proposal consortia are encouraged to include partners from the **widening countries** participating in the call: Bulgaria, Czech Republic, Hungary, Latvia, Poland, Portugal, Romania, Slovakia, Slovenia, and Turkey.

Target Outcomes

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

1. Quantum communication

Methods/tools/strategies to deal with the issues of distance, reliability, efficiencies, 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.

2. Quantum simulation

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

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

3. Quantum computation

Development of devices to realise 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.

[1] See 'FET Gatekeepers' p. 7 at
http://ec.europa.eu/research/participants/data/ref/h2020/wp/2016_2017/main/h2020-wp1617-fet_en.pdf

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.

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 optimized 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.

6. Novel ideas and applications in quantum science and technologies

Quantum phenomena, such as superposition and entanglement, as means to achieve new or radically enhanced functionalities.

Expected Impacts

Funded projects are expected to significantly advance the state-of-the-art of quantum sciences and technologies 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 to tackle these new challenges.

QuantERA Programme Coordination

National Science Centre (NCN), Poland

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