



UNI^QORN

Affordable Quantum Communication for Everyone

EU Horizon-2020 Project **UNI^QORN**

*Affordable Quantum Communication for Everyone:
Revolutionizing the Quantum Ecosystem from Fabrication to Application*

EU Horizon-2020, FET Flagship on Quantum Technologies
Grant Agreement n° 820474

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Executive Summary

Communication and dissemination of project results is of major importance for the project participants. The goal of the project partners is to raise awareness, inform and engage the target audience and promote the project's results. For these reasons we published a press release at the beginning of the project and designed the project's communication kit.

In this report we present the official press release prepared by the Project Coordinator in English and German language, which has been distributed by the consortium members as well. Further press releases will be distributed during the running time of the project. We also present the first material for our communication kit, which will be also updated and enhanced during the project's lifetime to meet the partners' needs and events requirements to reach the target audience.

The graphic materials are available on the project's website under the communication kit subpage.

1 Introduction

1.1 Purpose and scope of the document

The purpose of this report is to present the project's press releases and communication material designed at the beginning of the project in order to communicate the project's main ideas and ambition. These materials will be reviewed and updated during project's lifetime. The communication kit and the press releases can be used by the Commission, according to the Grant Agreement Article 38.2, to further disseminate the project's results.

1.2 Relation to other project work

The deliverable is prepared within Task 8.3 "Dissemination of foreground knowledge and communication activities", which describes the activities that will be taken by the consortium to promote the project's results. D8.3 is related to the following WP8 deliverables:

- D8.1 "**Factsheet and project presentation**" [M02]: It presents the first project's factsheet and the project's overview presentation.
- D8.2 "**Website development and creation of social media accounts**" [M02]: It presents the website and social media accounts set up in brief.
- D8.4 "**Promotion video availability**" [M10]: This deliverable will contain the design and script of the project video.
- D8.5 "**First period exploitation plans and project dissemination**" [M18]: It will contain the dissemination and communication strategies of the project partners individually and the consortium as a whole and will report on the dissemination and communication activities undertaken in the first 18 months of the project.
- D8.9 "**Final Press Release**" [M36]: It will contain all necessary information about the project's final results.

1.3 Structure of the document

The document is structured in the following way:

- In chapter 2 we present the official project press release in English and German language.
- In chapter 3 we present the communication kit.

2 Press releases

The Project Coordinator distributed the official press release at the beginning of the project in English and German language. In addition, the project partners distributed press releases to announce the project's start in different languages and in different media across their countries.

Press releases will be published in scientific printed and online magazines or other communication means containing important news about the project by the project partners during the project's lifetime.

Press release in English:

EU Quantum Flagship Project UNIQRN advances the next generation of quantum communication systems

The multidisciplinary project UNIQRN, which kicks off this month, will develop quantum technology for the mass market. Quantum communication systems, mostly found in research laboratories, will be squeezed into small and reliable photonic integrated circuits. By carefully laying out each element along the development chain from fabrication to application, the Horizon 2020 project will not only reduce size and cost, but will also bring improvements in terms of robustness and reproducibility.

Vienna, 29 October 2018:

Quantum communication is recognised as one of the pillars for the second quantum revolution thanks to its unique potential for information-theoretical data security. Turning this promise into tangible assets depends however, on the availability of high-performance, compact and cost effective modules for practical implementations. The Horizon-2020 project "UNIQRN – Affordable Quantum Communication for Everyone: Revolutionizing the Quantum Ecosystem from Fabrication to Application" was selected for funding by the European Commission within the first call of the H2020 Quantum Flagship. UNIQRN's goal is to link innovative yet user oriented research on the quantum frontier with near-future exploitation of early prototype components and system-on-chip implementations in a growing market with vast potential. The project kick-off took place in October 2018.

UNIQRN's mission is to provide the enabling photonic technology to accommodate quantum communications, by integrating complex systems, which are presently found on metre-size breadboards, into millimetre-size chips. These systems will not only reduce size and cost, but will also bring improvements in terms of robustness and reproducibility.

UNIQRN will be coordinated by Hannes Hübel, scientist and quantum expert at AIT Austrian Institute of Technology. "There is no doubt that this project will help to bridge the Quantum Divide" he says. "By offering cost-optimized quantum technology that follows a similar success story to microelectronics, not only governments and big organisations but also the general public will benefit from the offerings of the Quantum Age."

As a 3-year project UNIQRN will develop the key components for quantum communication systems such as true random number generation and secure-key distribution. This includes specialized optical sources and detector technology, which will be realized on mainstream fabrication platforms – similar to those used for the mass fabrication of microelectronics. System-on-chip integration will be an essential part of the research work and will lead to highly miniaturized quantum-optic systems that will unleash the potential of quantum mechanical features such as entanglement and light squeezing. The opto-electronic technology and

assembly processes involved have been carefully selected in terms of cost efficiency to deliver ultimate performance for the practical field deployment of quantum technology in the near future.

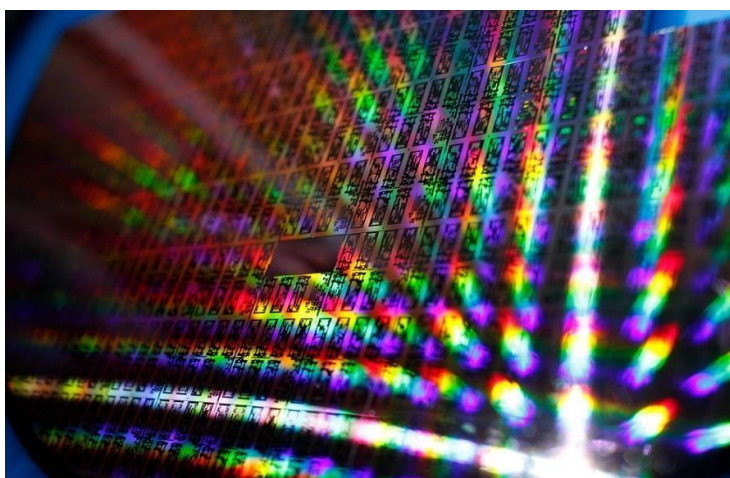
UNIQUORN will make the ambitious leap from quantum “fabrication” to quantum “application” as it evaluates its cutting-edge technology in novel protocols such as one-time programs or oblivious transfer. This will one day enable a wider range of end-users to exploit the power of quantum computing. Experimental activities will include real-world testing in smart-city environments in tandem with a wide range of telecommunication applications.

The UNIQUORN consortium with 17 partners from 9 European countries to address the multidisciplinary research agenda is led by AIT Austrian Institute of Technology as the project coordinator and the Institute of Computer and Communication Systems Athens as the technical manager. Further partners include research & technology organizations (Fraunhofer HHI, imec) with extensive experience in turning basic science into applicable assets will work together with quantum engineers with strong roots in theory and experimentation (University of Vienna, Paderborn University, University of Innsbruck, Technical University of Denmark). Photonic and electronic design, integration and packaging activities will be supported by experts in the field (Eindhoven University of Technology, Micro-Photon-Devices, Politecnico Milano, SMART Photonics, VPI Photonics, Cordon Electronics). The industrial end-user perspective will be provided through a system vendor, Mellanox, and operator, Cosmote, whilst field evaluation activities will be conducted in the live smart-city test-bed run by the University of Bristol.

About the Quantum Flagship

The Quantum Flagship was launched in 2018 as one of the largest and most ambitious research initiatives of the European Union. With a budget of €1 billion over 10 years, the flagship brings together research institutions, academia, industry, enterprises, and policy makers, in a joint and collaborative initiative on an unprecedented scale. The main objective of the Flagship is to consolidate and expand European scientific leadership and excellence in this research area as well as to transfer quantum physics research from the lab to the market by means of commercial applications and disruptive technologies. With over 5000 researchers from academia and industry involved in this initiative throughout its lifetime, it aims to create the next generation of disruptive technologies that will impact Europe’s society, placing the region as a worldwide knowledge-based industry and technological leader in this field.

<https://qt.eu/about/>



Picture: Photonic integrated circuits for quantum communication; copyright: AIT / Michael Mürling

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Press release in German

EU Quanten-Flagship Projekt UNIQORN führt die Quantenkommunikation in die nächste Generation

Die kürzlich ins Leben gerufene Initiative hat sich die Entwicklung von Quantentechnologien für den Massenmarkt zum Ziel gesetzt. Systeme für die Quantenkommunikation, welche derzeit meist nur in Laboratorien zu finden sind, sollen zu kompakten, robusten und integrierten Schaltungen miniaturisiert werden. Die Tätigkeiten des Horizon-2020 Projektes entlang der Wertschöpfungskette von Fertigung bis hin zur praktischen Anwendung von Quantentechnologie sind dabei nicht nur in Hinblick auf Miniaturisierung und Kosteneffizienz, sondern ebenso in Bezug auf Verlässlichkeit und Reproduzierbarkeit ausgelegt.

Wien, 29. Oktober 2018:

Quantenkommunikation ist ein wichtiger Eckpfeiler der zweiten Quantenrevolution und ermöglicht ein enormes Potential für informationstheoretische Datensicherheit. Eine praktische Implementierung künftiger Anwendungen erfordert jedoch nicht nur leistungsfähige, sondern auch kompakte und kosteneffiziente Module. Dieses Ziel verfolgt das europäische Horizon-2020 Projekt "UNIQORN – Affordable Quantum Communication for Everyone"

Revolutionizing the Quantum Ecosystem from Fabrication to Application". UNIQORN will mit innovativer nutzerorientierter Pionierforschung im Bereich der Quantentechnologie eine zeitnahe Verwertung früher Prototyp-Komponenten und System-on-Chip-Lösungen in einem Wachstumsmarkt mit enormem Potential ermöglichen. Der Kick-off für das Projekt erfolgte im Oktober 2018.

Ziel von UNIQORN ist es, photonische Technologien in der Quantenkommunikation zu nutzen und dafür komplexe Systeme, die derzeit optische Aufbauten in der Größenordnung von Metern benötigen, auf millimetergroßen Chips unterzubringen. Damit können nicht nur Dimension und Kosten deutlich reduziert, sondern auch Verbesserungen in puncto Robustheit und Reproduzierbarkeit erzielt werden.

Geleitet wird das Projekt UNIQORN vom AIT-Quantenexperten Hannes Hübel. "Wir sind überzeugt, dass dieses Projekt die 'Quantum Divide', also die Kluft zwischen Anwendern mit und ohne finanzielle Mittel schließen wird", so der Forscher. "Durch die Verfügbarkeit kostenoptimierter Quantentechnologien werden nicht nur Regierungen und große Organisationen, sondern auch die Allgemeinheit von den Vorteilen des Quantenzeitalters profitieren."

Das auf drei Jahre ausgelegte Projekt UNIQORN wird die Schlüsselkomponenten für die Quantenkommunikationssysteme der Zukunft entwickeln, die unter anderem zur Generierung von echten Zufallszahlen und die sichere Schlüsselverteilung eingesetzt werden. Dazu zählen spezialisierte quantenoptische Quellen und Detektortechnologien, die auf etablierten Fertigungsplattformen realisiert werden, ähnlich der Massenfertigung in der Mikroelektronik.

Ein wichtiger Schwerpunkt der Forschungsarbeiten liegt auf integrierten System-on-Chip-Lösungen. Sie bilden die Grundlage für hochminiaturisierte optische Systeme, die quantenmechanische Eigenschaften wie etwa Verschränkung und gequetschtes Licht voll ausschöpfen können. Bei der Auswahl der eingesetzten optoelektronischen Technologien und Fertigungsprozesse wurde großes Augenmerk auf Kosteneffizienz und Leistungsfähigkeit gelegt, um so dem praktischen Einsatz der Quantentechnologie in naher Zukunft zum Durchbruch zu verhelfen.

Zu diesem Zweck wird UNIQORN einen Bogen von der Fertigung bis zur Anwendung der Quantentechnologie spannen und die entwickelten bahnbrechenden Technologien in neuesten

Protokollen wie OTP (One-Time-Programs) und OT (Oblivious Transfer) evaluieren. Eines Tages wird dadurch ein breiterer Anwenderkreis von der Möglichkeit des Quantencomputers profitieren können, ohne in diese teure Technologie investieren zu müssen. Die entwickelten Systeme werden in einer realen Smart-City Umgebung im Zusammenwirken mit unterschiedlichen Telekommunikationsanwendungen getestet.

Im UNIQORN Konsortium, das vom AIT Austrian Institute of Technology koordiniert wird, arbeiten 17 Partner aus ganz Europa an einer multidisziplinären Forschungsagenda. Forschungsinstitutionen (AIT, Fraunhofer HHI, imec) mit langjähriger Erfahrung in der Überführung von Grundlagenforschung in die Anwendung werden mit QuantenforscherInnen mit theoretischem und experimentellem Know-how (Universität Wien, Universität Paderborn, Universität Innsbruck, Technical University of Denmark) zusammenarbeiten. Das Projekt kann auch auf ExpertInnen in den Bereichen Photonik und Elektronik, Integration und Packaging zurückgreifen (Eindhoven University of Technology, Micro-Photon-Devices, Politecnico Milano, SMART Photonics, Institute of Computer and Communication Systems Athens, VPI Photonics, Cordon Electronics). Die Perspektive der industriellen Endnutzer wird durch den Systemanbieter Mellanox und den Mobilfunkbetreiber Cosmote eingebracht. Die Evaluierung im Feld erfolgt in der Smart-City Testumgebung, die von der Universität Bristol betrieben wird.

Über das Quantum Flagship

Das Quantum Flagship wurde 2018 als eine der größten und ehrgeizigsten Forschungsinitiativen der Europäischen Union ins Leben gerufen. Mit einem Budget von 1 Milliarde Euro über 10 Jahre bringt das Flagship Forschungseinrichtungen, Hochschulen, Industrie, Unternehmen und politische Entscheidungsträger in einer gemeinschaftlichen Initiative mit beispiellosem Ausmaß zusammen. Das Hauptziel des Flagships ist es, die europäische wissenschaftliche Führung und Exzellenz in diesem Forschungsbereich zu festigen und auszubauen, sowie die Errungenschaften der Quantenforschung mittels kommerziellen Anwendungen und innovativen Technologien vom Labor auf den Markt zu übertragen. Mit mehr als 5000 ForscherInnen aus Wissenschaft und Industrie, die während der gesamten Laufzeit an dieser Initiative beteiligt sind, soll die nächste Generation disruptiver Technologien geschaffen werden, die die europäische Gesellschaft beeinflussen und Europa als wissensbasierten Industriestandort und Technologieführer auf diesem Gebiet weltweit positionieren wird.
<https://qt.eu/about/>

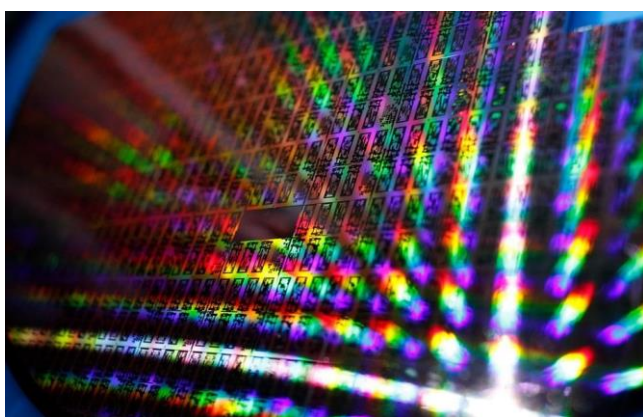


Bild: Hochintegrierte photonische Schaltungen für die Quantenkommunikation (Bild: AIT / Michael Mürling)

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3 Communication kit

3.1 Graphic material

At the beginning of the project we designed printed material, which will help us to communicate the project's activities and results to the target audience. These graphic materials have been designed in such a way to demonstrate that UNIQORN is funded under the Quantum Flagship.

3.1.1 Logo

At the beginning of the project we designed a project logo, which represents together with the project name the main elements of the visual identity. The logo has been created in three different types and also in different formats to meet the different requirements.

The different types of logos can be found on the project's website.



Figure 1: UNIQORN logos

Logo icon download:

https://quantum-uniqorn.eu/wp-content/uploads/2018/12/UNIQORN_Icon_HighRes.jpg

Logo with acronym download:

https://quantum-uniqorn.eu/wp-content/uploads/2018/12/UNIQORN_Logo_HighRes.jpg

Logo with title download:

https://quantum-uniqorn.eu/wp-content/uploads/2018/12/UNIQORN_Logo_Description_HighRes.jpg

3.1.2 Poster, Flyer & Factsheet

A poster, a flyer and a factsheet have been designed at the beginning of the project and can be found on the website. They will be updated with project results during project's lifetime and they will be used by the project partners to promote the project in different events such as scientific conferences, workshops and industry fairs.

Poster download:

<https://quantum-uniqorn.eu/wp-content/uploads/2018/10/UNIQORN-overview-poster.pdf>

Flyer download:

<https://quantum-uniqorn.eu/wp-content/uploads/2018/10/UNIQORN-project-leaflet.pdf>

Factsheet download:

https://quantum-uniqorn.eu/wp-content/uploads/2018/12/UNIQORN_project_factsheet-v1.pdf

During the project's lifespan, the project partners will update the poster, flyer and factsheet with project results and will adapt them to the needs of the different events.

3.2 Web presence

In UNIQORN we believe that building a strong web presence for the project will significantly support our communication and dissemination efforts. For this reason, we set up from the beginning of the project a website and social media accounts.

3.2.1 UNIQORN website

The UNIQORN website has been set up at the beginning of the project and is maintained by the Project Coordinator. It serves as the repository to the external to the project target audience and consists the main dissemination platform where all project activities and results will be made available. The UNIQORN website will be online for at least three years after the end of the project to support the dissemination of results beyond the end of the project.

UNIQORN Website:

<https://quantum-uniqorn.eu/>

<https://uniqorn-qt.eu>

3.2.2 Social networks

To support the dissemination and communication of project's activities and results during the project's duration and to allow for a two-direction communication with the target audience we set up from the beginning of the project a Twitter and a LinkedIn account. The social media accounts will be online for at least three years after the end of the project to support the dissemination beyond the project end. In addition, we set up a YouTube channel where we will upload all videos created by the project consortium within the context of the project.

Twitter:

Quantum UNIQORN

<https://twitter.com/UNIQORNFlagship> | @UNIQORNFlagship

LinkedIn:

Quantum UNIQORN

<https://www.linkedin.com/in/quantumuniqorn/>

YouTube:

Quantum UNIQORN

https://www.youtube.com/channel/UCUMr9q_lfbnJv7sRaSp85Eg?

The UNIQORN website and social media accounts are maintained by the Project Coordinator with input given by the project partners.