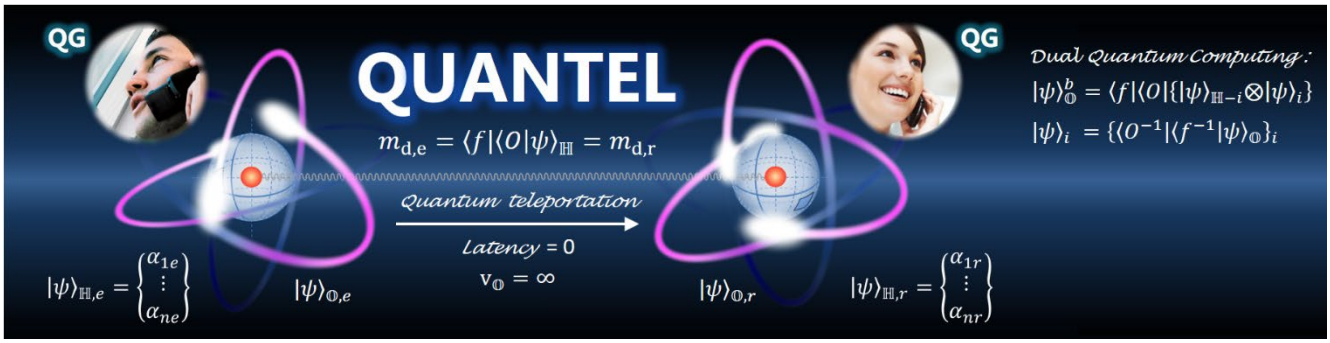
enterprise europe network

Research and Development Request



Profile title	**A Spanish Aerospace R&D institution is looking for partners to participate in the EIC Pathfinder Open Call leading a project to stablish an instantaneous quantum communication channel between Earth and Mars**
Short Summary	**The institution leading QUANTEL "Quantum Noise Teleportation", that pursues a Quantum Link capable of sending information at infinite speed without energy exchange, is looking for partners in quantum physics & materials, electronics, quantum cryostat technology, electromagnetism, quartz lattices and mechanical engineering machining.** **The goal is to teleport information based on the entanglement of the oscillation of the state of two remote hadrons, which occurs when they are tuned in the same quantum band.**
Full Description	**The Spanish Aerospace Technologies Centre aims at developing a new Quantum Entanglement Link (Q-Link) capable of converting an electromagnetic signal containing information into quantum noise, which can be instantaneously shared by another remote Q-Link whose massively entangled elementary particles are tuned in the same Quantum Energy Band (QEB).**

Assuming that the quark condensate $\langle H_m \rangle$ term of the mass decomposition of a proton oscillates in an extremely narrow QEB belonging to a huge non-physical spectrum (see Fig_1), it would be possible to share information without violating the energy conservation principle if we could entangle the state $\langle H_m \rangle_S$ of a sender proton with the state $\langle H_m \rangle_R$ of a remote receiver proton. This kind of quantum entanglement between point S and point R, called **Metric Entanglement**, occurs in a one-dimensional Banach space $\mathcal{O}$ that belongs to a non-physical domain of reality denoted $\mathbb{O}$ **when $\|\overrightarrow{SR}\| = 0$, which reduces to the condition $\langle H_m \rangle_S = \langle H_m \rangle_R$.**

Hence, the entanglement of the oscillation (or quantum noise) of $\langle H_m \rangle_S$ and $\langle H_m \rangle_R$ occurs when $\langle H_m \rangle_S$ and $\langle H_m \rangle_R$ are tuned in the same QEB, no matter how remote S and R might be.

In this entangled state, no observers or classical communication channels are needed for protons in R to oscillate according to the oscillation induced in S, which is devoid of energy in the physical domain because it is below the underlying background energy, also referred to as Zero-point energy (ZPE).

We also assume that an electromagnetic induced lattice vibration in an homogenous quantum material close to 0K overwrites the quantum noise (oscillation) signature of the state $\langle H_m \rangle_S$ of all sender protons tuned in the same QEB_S if the energy of such induced oscillation divided by the number of protons in S and multiplied by the fermionic amplification factor f_{af}, which is the internal permeability of hadrons to environmental energy, is within the order of magnitude of ZPE, and QEB_S is only occupied by protons in S.

In this state, we can entangle $\langle H_m \rangle_S$ with the state $\langle H_m \rangle_R$ of the protons of a twin receiver material R in the same conditions as S. Then, R will emit an electromagnetic signal amplifying the quantum noise generated in S that could be detected by a multimeter connected to R.

The Centre is looking for partners in all sciences and technologies related to complete the consortium before applying to the EIC Pathfinder Open call for proposals.

Advantages and Innovations	**While the speed of information exchange in communications based on single photon emission (quantum light) or quantum entanglement observed by classical channel-synchronized observers are limited by the speed of light, the Centre's Q-Link can instantaneously send and receive information between two remote points near 0K based on the macroscopic entanglement of the quark condensate term $\langle H_m \rangle_S$ of the QCD mass decomposition of the protons in a sender piece of quantum material S with the analogous term $\langle H_m \rangle_R$ of a receiver twin piece of quantum material R such as $\langle H_m \rangle_S = \langle H_m \rangle_R \in QEB_0$, being QEB_0 an empty QEB in $\mathcal{O} \in \mathbb{O}$.** Light speed limitation is not a problem for distances on Earth, but it is for astronomical distances in deep space missions. NASA's Mars laser communications relies on photons that take 15 minutes to travel back to Earth, which provide no real time control of missions and face beam decoherence. Furthermore, when future technology brings us deeper in space, crews will be isolated from Earth. **The Centre's Mars Q-Link is a portable device much cheaper and smaller than NASA's, and capable of teleporting information** if thermal noise can be dimmed below the quantum noise order of magnitude.
Technical Specification or Expertise Sought	**The Spanish Aerospace Technologies Centre is looking for partners capable of leading or cooperating in the necessary tasks to build the technological demonstrators of its Mars Q-Link, including the cryogenic capsule, the quantum material and the customized cryostat components, and test it. The required expertise we are looking for in our partners encompass:** • **Optical table cryostats for quantum technologies.** • **Measuring platforms for Optical table cryostats (FIG_4).** • **Cryogenic capsules for quantum technologies (see FIG_2 and FIG_3).** • **Cavity quantum electrodynamics and quantum physics.** • **Advanced mathematics for elementary physics.** • **Mechanical manufacturing for precision components.** • **Piezoelectric quartz crystals.** • **Microelectronics.** • **Electronic measurement systems.** • **Amplifiers and transducers.**

	• **Instrumentation and testing in vacuum chambers.**
Stage of Development	☒ Under development
IPR Status	☒ IPR applied for but not yet granted
Sustainable Development Goals	☒ GOAL 7: Affordable and Clean Energy ☒ GOAL 9: Industry, Innovation and Infrastructure ☒ GOAL 11: Sustainable Cities and Communities ☒ GOAL 12: Responsible Consumption and Production ☒ GOAL 17: Partnerships to achieve the Goal
Expected Role of Partner	The main deliverables of **QUANTEL** (**Quantum Noise Teleportation) Project,** are a cryogenic capsule to expose a piece of quantum material to electromagnetic fields below 4K temperature, a customized cryostat to keep the quantum material in the cryogenic capsule at the operating temperature, the selection of the best quantum material for the massive quantum entanglement of sender and receiver in the Mars Q-link, and the electronics and measuring and amplifying devices. Milestones are: • Manufacturing of the Cryogenic capsule. • Customization of two cryostats. • Selection of the best quantum material. • Manufacturing of the electronics for the Mars Q-Link**.** Work Packages are: **WP1.** Project Management. **WP2.** Cryogenic capsule. **WP3.** Cryostat. **WP4.** Quantum material.

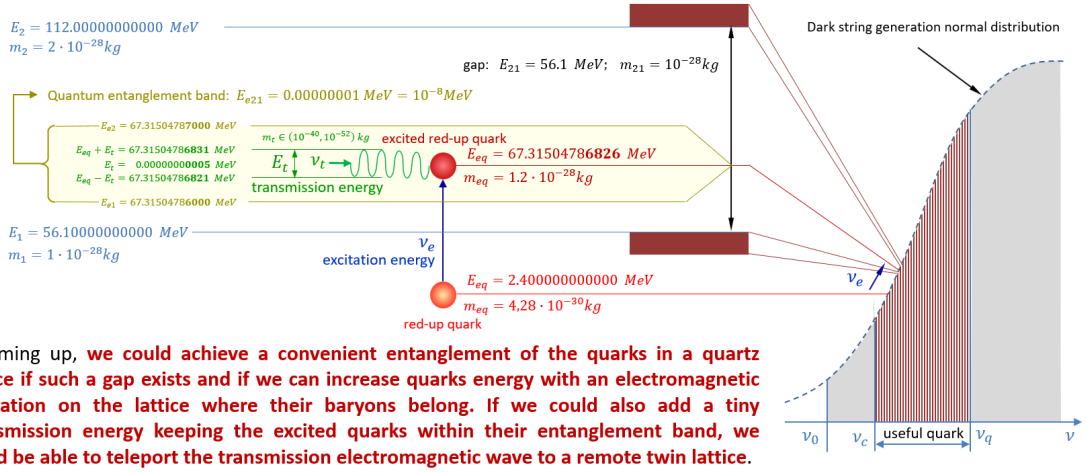
	WP5. Electronics and measuring equipment. **WP6.** Q-link assembly. **WP7.** Q-link Testing. **WP8.** Communication and Dissemination They are looking for partners, either public or private, such as: • Enterprises (both consolidated or start-ups), • Research and Development Centres, • Universities. They need partners to share tasks in WP2, WP3, WP4, WP5, WP6, WP7 and WP8. They also need partners to lead WP3, WP4, WP5, WP6 and WP8. Multiple types of partners and partnerships can be considered. The tasks to be performed by the partner sought should be consistent with the type(s) of partnership discussed in the summary, the description and other profile fields.
Type of Partnership	☒ Research cooperation agreement
Type and Size of Partner	☒ Big company ☐ Other ☒ R&D institution ☒ SME 11-49 ☒ SME 49 – 249 ☒ SME<=10 ☒ University
Framework program	**HORIZON EUROPE -** Funding a PATHFINDER OPEN call of the European Innovation Council
Call Name and identifier	**Work Programme reference: PATHFINDER OPEN 2024.** **Call deadline date: 07/03/2024**
Submission and	According to the Pathfinder Open Guide 2024:

Evaluation Scheme	https://eic.ec.europa.eu/eic-funding-opportunities/eic-pathfinder_en https://eic.ec.europa.eu/document/download/d801a0d8-492e-4510-9dd6-8d942756e7c7_en?filename=EIC-workprogramme-2024.pdf
Anticipated Project Budget	3.000.000 € (Higher funding requests would be allowed if properly justified)
Coordinator Required	☐ Yes ☒ No
Deadline for Expression of Interest (EOI)	**31/01/2023**
Deadline for Call	**07/03/2024**
Project Duration in weeks	260 weeks
Weblink to the Call	https://ec.europa.eu/info/funding-tenders/opportunities/portal/
Project Title and Acronym	Quantum Noise Teleportation **QUANTEL**
Market Keywords	**01004**-Data Communications, **03004**-Electronics Related Equipment, **08001**-Chemicals and Materials, **08003**-Industrial Equipment, **090004**-Manufacturing .
Technology Keywords	**01001**-Electronics, microelectronics, **02001** - Design and Modelling / Prototypes, **02002** - Industrial Manufacture, **02007** - Materials Technology, **05003** – Physics, **09002** - Amplifier, A/D Transducer, **09003** - Electronic measurement systems.
Targeted countries	All European Union members and associated countries
Sector Groups involved	☒ Aerospace and Defence ☒ Electronics ☒ Materials ☒ Renewable Energy

2 Quantum coherence in the new Theory of Universal Order

Metric Entanglement Procedure for the Teleportation of an Electromagnetic Wave

Zooming up the diagram of the example, we can appreciate the expected energy value of the gap (56.1 MeV) and the tiny size of the expected entanglement band (10^{-8} MeV), where the transmission energy oscillates in a even smaller band of $5.61 \cdot 10^{-11}$ MeV.



Summing up, **we could achieve a convenient entanglement of the quarks in a quartz lattice if such a gap exists and if we can increase quarks energy with an electromagnetic excitation on the lattice where their baryons belong. If we could also add a tiny transmission energy keeping the excited quarks within their entanglement band, we could be able to teleport the transmission electromagnetic wave to a remote twin lattice.**

QUANTEL CRYOGENIC CAPSULE

QUANTEL MEASURING PLATFORM PROPOSAL