

The Gordon and Betty Moore Foundation awards ICFO?s frontier research on Quantum Science

Dr Hugues de Riedmatten receives $1.1M grant to link quantum nodes for the quantum internet

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In 2018, a representative of the Gordon and Betty Moore Foundation visited ICFO in search of frontier research with potential global impact in the area of quantum science. The Moore Foundation, founded by Gordon Moore, well known for his role in the foundation of Intel Corporation and also for authoring Moore's Law, seeks to help understand how the world works while paving the way to far-reaching benefits for society. The foundation recently announced the award of a $1.1 million research grant to ICREA Professor at ICFO, Dr Hugues de Riedmatten, based on his whitepaper outlining an ambitious project to link quantum nodes for the quantum internet.

In today's world of cutting edge science, researchers normally spend a fair amount of their

time competing for funding from national or international funding agencies. This requires having an ear to the ground for calls, and then crafting grant proposals that fit within risk limits of the call and vie for limited funding alongside other world class researchers. Prof. de Riedmatten has been successful in obtaining competitive funding as demonstrated by his ERC Starting grant (2011), participation in an ERC Advanced Grant (2017) and participation in 2 of the 20 research projects in the recently launched European Quantum Flagship initiative. He has achieved high impact results and has published in the top journals in his field such as Nature, Nature Communications, Physical Review Letters, among others. In 2017, Barcelona's City Hall awarded de Riedmatten with the i¿½City of Barcelona Awardi¿½ for advances in the area of hybrid quantum networks acknowledging the far-reaching relevance of his work and the strength of his reputation as a leading scientist. Support from the Cellex Foundation has been a decisive factor in all of these projects and achievements.

The project that de Riedmatten and the team he leads will carry out aims to experimentally demonstrate fundamental purely quantum effects such as entanglement, between different quantum physical platforms or nodes, made with different materials (solid crystals or ultra-cold atoms). The idea is to create a hybrid network of quantum systems, with each particular platform running a specific task according to its capabilities. The hybrid entanglement between these many-particle quantum systems based on different physical platforms would then be followed by the experimental demonstration of teleportation of quantum information between these systems. The ultimate goal would be to obtain an efficient and reliable distribution of quantum information over quantum networks. i¿½**It is very important that fundamental and applied research go hand in hand**i¿½, comments Pro . de Riedmatten. i¿½**This kind of grant supporting fundamental, curiosity driven and risky projects allows us to explore new directions that may one day lead to new technology**.i¿½

The Moore Foundation has awarded many research grants over the years to foster scientific discovery, environmental conservation, patient care improvements and preservation of the special character of the San Francisco Bay Area. The majority of these awards have gone to US based institutions and include a notable large endowment to Caltech, Gordon Moore's alma mater, to support basic research and discovery science in the life and physical sciences. That being said, their mission to i¿½foster path-breaking scientific discoveryi ?½ extends beyond the US borders and fosters international collaboration that is conduciv to major breakthroughs. Likewise, it is highly flexible and complementary to any other nati nal or international funding that the scientist may receive.

ICFO Director Lluis Torner emphasizes, i¿½**We are extremely proud to receive this grant from the Gordon and Betty Moore Foundation. That they came across the Atlantic to pick up one of our best research projects is an indication of the exceptional vision of the program managers**

of the Foundation and a further sign of the global quality and impact of the research conducted at ICFOi¿½.