

# Q4Real Project

## (Quantum Computing for Real Industries)

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**Aitor Moreno Fdz. De Leceta**

Beatriz Garcia Markaida  
Iñigo Perez Delgado

*Ibermática, Avenida de los Huetos, 75, Edificio  
Azucarera, 01010 – Vitoria – Gasteiz*

[ai.moreno@ibermatica.com](mailto:ai.moreno@ibermatica.com)

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We are witnessing the so-called second quantum revolution focused on exploiting the enormous advances that have been made in recent years in the ability to manipulate matter at the quantum level. These physically formidable developments are driving rapid developments in various fields and, in relation to the present project, especially in the new paradigm of quantum computing. The final goal of the Q4Real project is to create a platform of state-of-the-art digital capabilities for quantum computing that serves to accelerate the deployment of applications with a sustainable impact in the industry. Ibermática an Ayesa company leads a consortium of companies that works on the creation of the Q4Real platform of cutting-edge digital capabilities for quantum computing, which serves to prepare the quantum ready journey for the industry. ITS company and the R&D unit of the Ibermática Group and the Ibermática Institute of Innovation (i3B) are part of the consortium. It is completed with the participation of Serikat, Quanvia, Multiverse, Mercedes-Benz Spain, as well as the agents of the RVCTI, Tecnalía, UPV/EHU and the DIPC Donostia International Physics Center.

To achieve this general objective, the project focuses on the following four specific objectives:

- Formalization and quantum programming of common problems in the industrial domain: distribution and logistics, industry 4.0, Energy and Automotive, Industrial Cybersecurity.
- Computation and deployment the uses cases in the available quantum platforms, Annealers / Universal Quantum Computers, and quantum inspired with hybrid approaches.
- Development of a knowledge base and components for different types of quantum computational problems as Quantum Machine/Deep Learning, Digital Twins Simulation at Industry and Industrial Quantum Process Optimization
- Generation of Quantum SW Engineering practices, transversally in all uses cases, as hybridization of HPC/Quantum systems, testing and verification practices in non-deterministic contexts, performance metrics on classical approaches, quality or sustainability and quantum DevOps processes.
- Bridging the gap with the business solutions market, with several formulation and road mapping methodologies and impact assessments. Strategically, at the end of the project, the first capacities will have been developed with a certain critical mass for the development of quantum computing solutions, contributing to the development of a unique ecosystem in the quantum real industries.

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### References

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- [1] <https://ibermatica.com/ibermatica-an-ayesa-company-crea-una-plataforma-cuantica-para-acelerar-el-despliegue-de-aplicaciones-industriales/>