Launch of the new QPLANET pilot line

The recently launched Pilot Line aims at building Europe's first quantum industrial pilot line based on the next generation of neutral atom based quantum chips

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Recently launched in Brussels, Q-PLANET, a new European initiative, has the objective of bringing neutral atom quantum technology out of the lab and into industrial production, Funded with ?50 million, the pilot line, coordinated by Pasqal, brings together 28 research organizations, including ICFO, industrial partners, and academic groups across 11 EU member states, with the goal of building a resilient, scalable European supply chain for quantum chips.

The project was formally kicked off on July 8th-9th and is structured under a six-year Framework Partnership Agreement with the European Chips Joint Undertaking. An initial three-year phase is now underway, with a second phase expected to follow to expand user adoption and further mature the technologies developed in the first stage.

Over its first phase, Q-PLANET will focus on advancing a set of essential components for

neutral atom quantum systems, including lasers operating at four key wavelengths (461, 698, 795, and 1013 nm), atom chips used in quantum sensing and computing, and microfabricated vapor cells for atomic clocks and field sensors. These components are expected to progress from technology readiness level 4 to level 6 across three iterative cycles of design, fabrication, and testing. The consortium will also establish standardized Process Design Kits and Assembly Design Kits, intended to facilitate processes for startups and small and medium enterprises seeking to build expertise in quantum manufacturing.

Why This Matters

Quantum technologies have moved rapidly from a theoretical perspective to a strategic priority, with applications now spanning drug and materials discovery, navigation and earth observation through quantum sensing, and highly secure communication networks. Nevertheless, the field faces a critical bottleneck. As highlighted by the European Quantum Strategy, unlocking the full economic and societal value of these technologies depends on achieving industrialization at scale by 2030, and today that scale remains a little far fetched. The obstacles are largely structural rather than scientific. Europe currently lacks the standardized, replicable manufacturing processes needed for mass production of quantum components, along with common frameworks for design, calibration, control, and testing. Energy efficiency monitoring across the production cycle is similarly underdeveloped. Without these foundations, even breakthrough quantum research risks stalling before it reaches real world deployment. Pilot lines like Q-PLANET exist precisely to close this gap, creating the shared infrastructure, tooling, and industrial know how that individual labs and companies cannot build alone, while positioning Europe competitively in a technology race where the United States and China are also investing heavily.

ICFO's Role in the Consortium

Among the consortium partners contributing to Q-PLANET, ICFO will be participating in the consortium as a quantum technology provider and as one of the project's key testing sites. ICFO's contribution draws on three of its research groups. The Atomic Quantum Optics group, led by ICREA Prof. at ICFO Morgan Mitchell, is developing quantum sensors built on atomic vapors using MEMS cells. The Ultracold Quantum Gases group, led by ICREA Prof. at ICFO Leticia Tarruell, is conducting quantum simulations on degenerate gases and Rydberg atom arrays, work that includes the first strontium quantum gas microscopes. The Quantum Photonics with Solids and Atoms group, led by ICREA Prof. at ICFO Hugues de Riedmatten, is developing atomic based quantum memories and quantum network nodes using Rydberg superatoms.

Beyond its research contributions, ICFO will serve as a testbed for validating components developed elsewhere in the consortium. Components operating at 461 nm and 698 nm will be tested on ICFO's quantum simulation and computing platforms, while components at 795 nm will undergo testing for quantum sensing, quantum memory, and quantum network applications.

This combination of tasks positions ICFO as an active member within Q-PLANET, contributing expertise across sensing, simulation, and photonics while also validating laser components across three of the project's four target wavelengths, work that will help determine whether these technologies are ready to move from promising research results to dependable industrial products.