



Frontiers of Quantum Atom-Light Interactions

Fact Sheet

Project Information

FoQAL

Grant agreement ID: 639643

[Project website](#)

DOI

[10.3030/639643](https://doi.org/10.3030/639643)

Project closed

EC signature date

19 February 2015

Start date

1 March 2015

End date

31 May 2020

Funded under

EXCELLENT SCIENCE - European Research Council (ERC)

Total cost

€ 1 340 873,00

EU contribution

€ 1 340 873,00

Coordinated by

FUNDACIO INSTITUT DE
CIENCIES FOTONIQUES



Spain

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Light years ahead: EU research and innovation projects show how photonics will shape the future

Project description

Shedding light on new quantum horizons

Researchers are paving the way for transformative applications in quantum technologies. The ERC-funded FoQAL project aims to revolutionise our ability to manipulate light-matter interactions at the quantum level. By leveraging cold atoms and nanophotonic systems, it will exploit unique features such as dimensional control, dispersion of light, and quantum vacuum forces. Key breakthroughs include nanoscale traps utilising quantum vacuum forces, enabling trap depths and spatial confinement surpassing conventional techniques by 1 2 orders of magnitude. FoQAL will also demonstrate strong spin-photon-phonon interactions, generating novel long-range interactions and exotic quantum states of light and matter. The project will also develop new approaches for single-photon nonlinear optics, capitalising on engineered long-range interactions between atoms. Overall, the project's ground-breaking advancements will propel quantum technologies into new frontiers.

Fields of science (EuroSciVoc)

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Programme(s)

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FUNDACIO INSTITUT DE CIENCIES FOTONIQUES

Net EU contribution

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Total cost

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Address

AVINGUDA CARL FRIEDRICH GAUSS 3

08860 Castelldefels

 **Spain** 

Region

Este > Catalunya > Barcelona

Activity type

Research Organisations

Links

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Beneficiaries (1)



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European Union, 2025