



Call 2017

InterPol

Polariton lattices: a solid-state platform for quantum simulations of correlated and topological states

Michał Matuszewski





SUCCESS STORY (highlights)



CHALLENGE

The development of quantum simulation lacks compact on-chip scalable platforms



SOLUTION

To implement polariton lattices in semiconductor microcavities as a photonic-based solid-state platform for quantum simulations



PLANNED AND SURPRISING/UNPLANNED OUTCOMES

1. Demonstration of single photon interactions
2. Fabrication of samples for studies in the quantum regime
3. Investigation of new phases and universality of open quantum systems
4. Development of new numerical methods for open quantum systems
5. Simulation of topological phases

IMPACT (RRI aspects)



GENDER:

Project included two female PIs including the project coordinator.
Participation in an event to support girls in Physics



OPEN SCIENCE:

Results of the project published in open access journals
Open data practices



SCIENCE EDUCATION:

Lectures and seminars about the project for students
Talk at a secondary school in London



PUBLIC ENGAGEMENT:

Article in a popular science French magazine (around 20.000 printed copies)
Public lecture at the „Festival of Science” in Warsaw



IMPACT (potential users)



RELEVANT INDUSTRY BRANCH

Companies engaged in the development of quantum technologies with on-chip solid-state quantum simulators



KEY COMMERCIALY RELEVANT APPLICATIONS

Possible applications in artificial intelligence, quantum chemistry, ultrafast optical signal processing and quantum optical computation, thresholdless nanolasers, quantum optomechanics



EXISTING/POTENTIAL END USERS

Potential end users include industries that can benefit from the development of quantum simulators in a scalable platform which can be integrated with existing semiconductor technology



QUANTERA

ERA-NET Cofund in Quantum Technologies



This project has received funding from the European Union's Horizon 2020 research and innovation programme under Grant Agreement No. 731473.