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About ColOpt



ColOpt is a novel research and training network for young scientists in the fields of cold atoms, quantum physics, optical technologies and complexity science.

The research training provided will comprise a broad portfolio of technical and transferable skills training on local and network level.

Major secondments to partners, in particular inter-sectorial placements, are an intrinsic part of the network experience.

Each of the fifteen individual projects will be part of a vibrant and stimulating international and inter-sectorial collaboration.

Our graduates will be excellently prepared for a broad range of academic and industrial careers and be at the forefront to drive the emerging quantum technologies.

Partners



UNIVERSITÀ
DEGLI STUDI
DI MILANO



Eidgenössische Technische Hochschule Zürich
Swiss Federal Institute of Technology Zurich

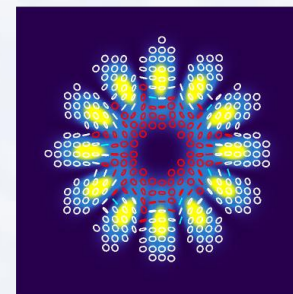
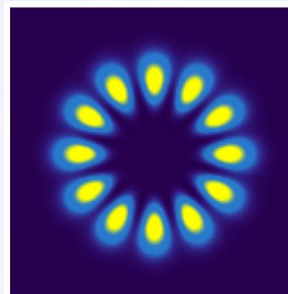
Project Contact



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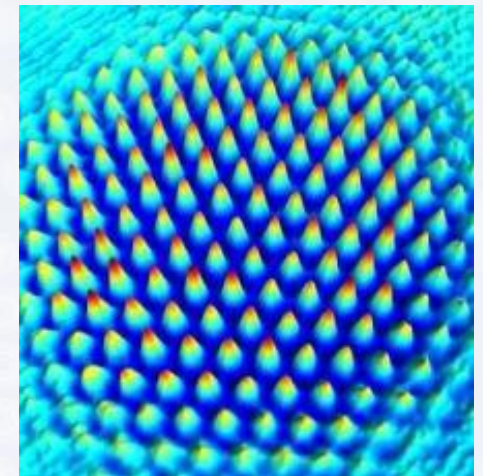
Website: <http://colopt.phys.strath.ac.uk>



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Collective effects and Optomechanics in Ultra-cold Matter

ColOpt



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European Training Network

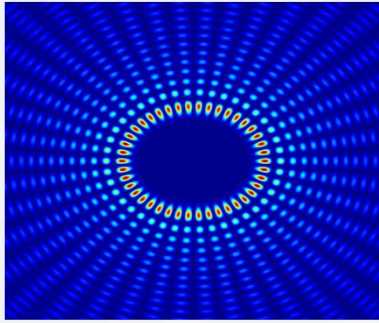
Funded by the
Marie Skłodowska-Curie Action
January 2017 – December 2020



This project receives funding from the European Union's Horizon 2020 research and innovation programme under the Marie Skłodowska-Curie grant agreement No 721465.



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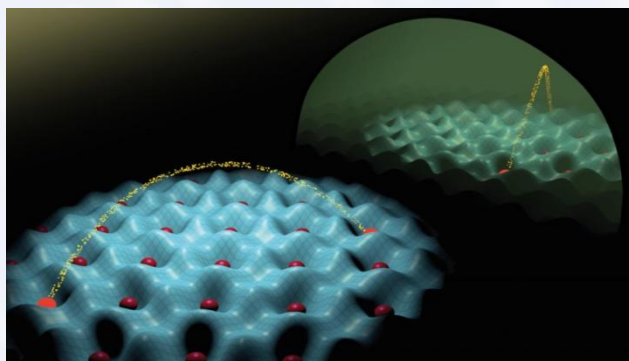
ColOpt Research



ColOpt's research programme focuses on collective interactions of structured light with laser-cooled cold and quantum-degenerate matter.

Collective, nonlinear dynamics and spontaneous self-organization are abundant in nature, sciences and technology and of central importance.

Building on this interdisciplinary relevance, a particular novelty of ColOpt is the integration of classical and quantum self-organization. We will explore innovative control of matter through opto-mechanical effects, identify novel quantum phases, enhance knowledge of long-range coupled systems and advance the associated trapping, laser and optical technologies, thus establishing new concepts in quantum information and simulation.



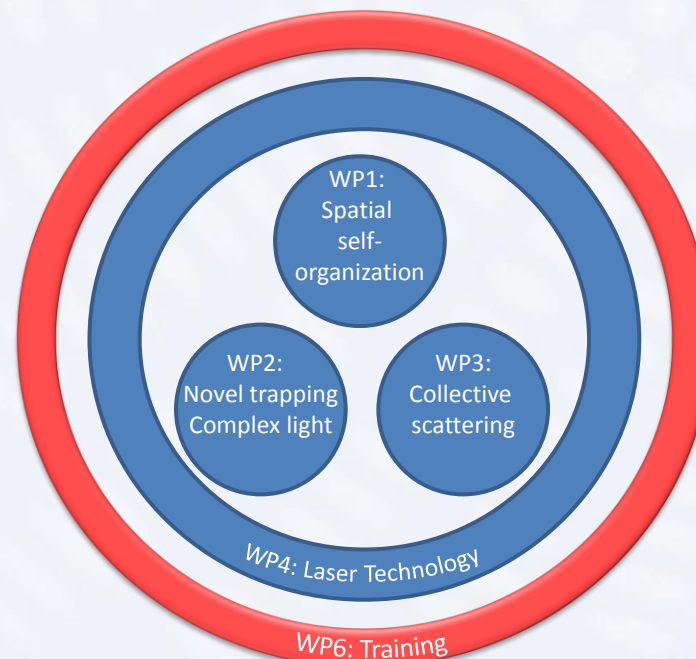
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ColOpt Research

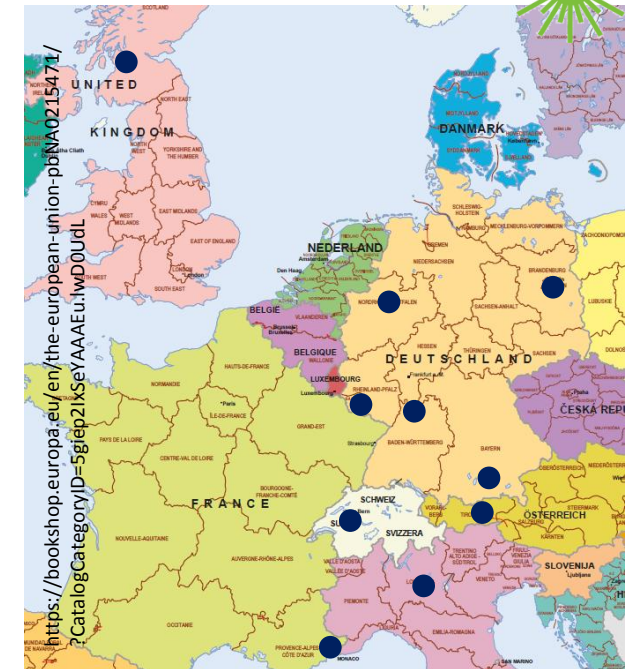


Four scientific work packages will explore:

1. **Spatial self-organization**
This WP studies the spontaneous emergence of regular spatial order from optomechanical nonlinearities in cold atomic ensembles as well as quantum degenerate gases.
2. **Novel trapping schemes and complex light fields**
This WP advances light trapping tools for application in quantum information technology realizing complex, unconventional and disordered potentials and to store information in quantum coherences.
3. **Collective scattering and coupled dipoles**
This WP addresses phenomena of collective scattering and interaction of dipoles emerging at high optical density due to the interaction of many atomic dipoles.
4. **Laser technology**
Two leading European laser manufacturers will advance the performance of Ti:Sapphire and semiconductor laser systems.



Our Network



The ColOpt network brings together fifteen world leading research organisations and industry in the fields of cold atoms, quantum physics, optical technologies and complexity science:

- University of Strathclyde, Department of Physics
- University of Glasgow, School of Physics and Astronomy
- Università degli Studi di Milano, Dipartimento di Fisica
- Westfälische Wilhelms-Universität Münster, Institut für Angewandte Physik
- Eberhard Karls Universität Tübingen, Physikalisches Institut
- Universität des Saarlandes, Theoretical Physics
- ETH Zürich, Institute for Quantum Optics
- Universität Innsbruck, Institute for Theoretical Physics
- CNRS, Institut de Physique de Nice
- TOPTICA Photonics AG
- Holoeye Photonics AG
- M Squared Laser Ltd
- Third country partners:
 - University of São Paulo, Instituto de Física
 - University of Wisconsin, Department of Physics



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