UNIÃO EUROPEIA
Fundo Europeu
de Desenvolvimento Regional

Designação do projeto | GreenNanoSensing – Quantum NanoSensing for Renewable Energy and Environmental Management
Código do projeto |POCI-01-0145-FEDER-032257 - PTDC/FIS-OTI/32257/2017
Objetivo principal |Desenvolvimentos de sensores óticos para a deteção de hidrogénio e campo eletromagnético baseado em meta-materiais funcional para aplicações em segurança e monitorização de processos industriais.
Região de intervenção | Norte
Entidade beneficiária | INESC TEC - Instituto de Engenharia de Sistemas e Computadores, Tecnologia e Ciência

Data de aprovação | 24-04-2018
Data de início | 01-07-2018
Data de conclusão | 30-06-2021
Custo total elegível | 239 896,43€
Apoio financeiro da União Europeia |FEDER: 203 911,97€
Apoio financeiro público nacional/regional | 35 984,46€

The project aims:
This project develops low-cost hydrogen and electromagnetic field sensing solutions, based on exotic optical properties resulting from light-field excitons supported by nanostructured materials (metamaterials) with applications in safety and monitoring of industrial processes(e.g. alternative energies based on hydrogen).
Recent developments in Nanotechnologies allow to fabricate exotic materials that only existed as theoretical speculations (e.g. optical metamaterials). Their fundamental properties and functionalization into real world applications depend from their support of diverse types of polaritons, resulting from the coupling between the electromagnetic field and different forms of excitons. For structures below a few hundred nanometers, the excitons become strongly confined and exhibit quantum, nonlinear and nonlocal features that are no longer described by mean field quantities, such as the refractive index but instead, by detailed microscopic many-body models, which can only be calculated numerically using supercomputing.
The objectives of this project cover challenges from fundamental nanoscience, to fabrication methods and to technological applications that combine several European Key Enabling Technologies (KETs), starting with the development of models and simulations tools, their use in the design of functional nanostructured materials for sensing and the development of fabrication and characterization techniques.