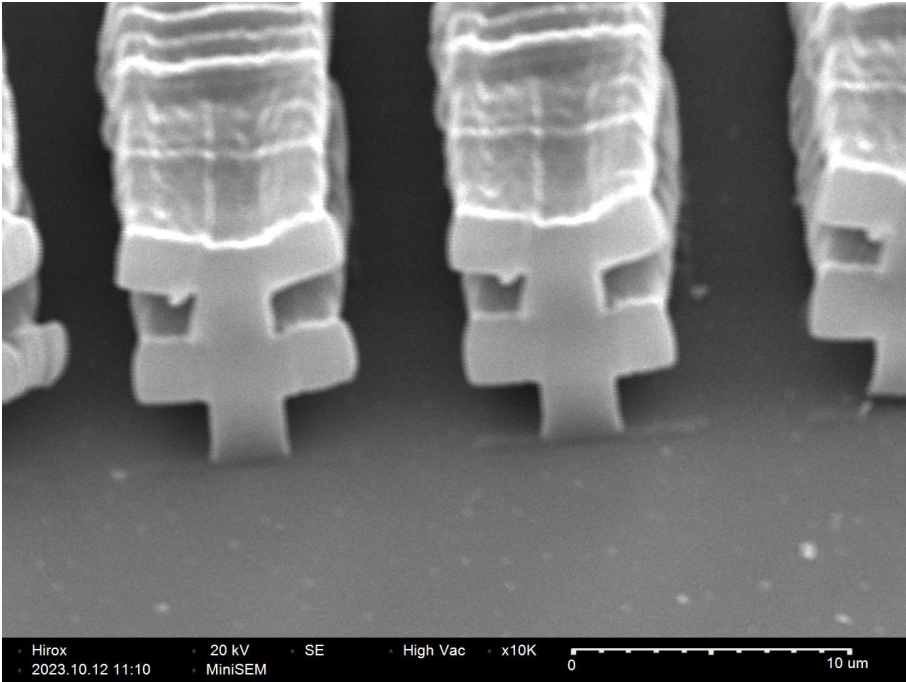


Research topic proposal for an MSCA Postdoctoral Fellowship 2025

Topic title:	Modelling and design of 3D nano-structured surfaces for industrial photonics applications
Topic description (0.5 page max.):	<p>This Postdoc will centre on the electro-magnetic modelling, design and optimisation of novel photonic meta-surfaces. The aim is to take full advantage of the new industrial scale 2D and 3D nano-fabrication possibilities offered by the massively parallel-write multiphoton photoplotter now operational in the cleanrooms of the IMT Atlantique Optics Department (ARAGO platform). This new photoplotter, developed through a series of EU and French national projects (Phenomenon, FABulous, Nanoshape (https://fabulous3d.eu/)) offers unique opportunities for the industrial scale fabrication of highly innovative 3D nano-structures. Nano-structure modelling/design will be performed using both commercial software packages (LightTrans, PlanOpSim, Lumerical etc.) and code/modules developed by the candidate. Meta-structures to be studied include propagation phase (effective refractive index), Pancharatnam-Berry phase and resonant regimes and those based on the candidates own experience/ideas to develop structures best adapted to the constraints of the new photoplotter. The work will be performed in close collaboration Optics Department PhDs and researchers and academic and industrial partners including Oberthur, Essilor-Luxxotica, Rochester University, Optics Institute Fraunhofer IISB, Heidelberg Instruments GmbH.</p> 
Keywords:	Nano-structure, metasurface, meta-material, photonics, electro-magnetic modelling, multi-photon fabrication.

Background/ competencies/ skills needed from the candidate:	<ul style="list-style-type: none"> - Background and experience in digital modelling (Matlab, Python, C etc.) of physical processes – particularly electro-magnetics/photonics - Experience of cleanroom work and photolithographic fabrication and/or characterisation techniques (optical/electronic microscopy, spectroscopy ...) would be an advantage but not essential - Aptitude for laboratory experimentation (fabrication) and applications. - Ability to work and write scientific reports and articles in English. French is not required initially.
Supervisor(s):	Kevin Heggarty https://www.imt-atlantique.fr/en/person/kevin-heggarty