



The MetaMagIC project kicks off, coordinated by ICMAB Researchers

The project explores the unparalleled magnetic properties of metasurfaces



Members of the MetaMagIC Project Team from the UAB and ICMAB: Àlvar Sànchez (UAB), Anna Palau (ICMAB), Lluís Balcells (ICMAB), Narcís Mestres (ICMAB), Aleix Barrera (ICMAB), Jordi Alcalà (ICMAB), Thomas Günkel (ICMAB), Natanael Bort (UAB) / ICMAB-CSIC

The “Magnetic Metasurfaces for sustainable Information and Communication Technologies” (MetaMagIC) European Project addresses the efficiency and sustainability of the magnetic devices currently used in Information and Communication Technologies.

The project kicked off on 1 February 2022, on a hybrid event that allowed all the numerous partners to meet up and discuss how to approach their proposal. MetaMagIC is coordinated by the Institut of Materials Science of Barcelona, ICMAB-CSIC (Anna Palau), which is partnering with the Universitat Autònoma de Barcelona, UAB (Àlvar Sànchez), the Université de Liège in Belgium (Alejandro Silhanek), the University of Bath in UK (Simon Bending) and the Brno University of Technology in Czech Republic (Vojtěch Uhlíř).



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“Our project will explore a completely novel approach, using metasurfaces composed of a tailored arrangement of hybrid components, to provide unprecedented control over magnetic fields at low scales, in a way impossible to achieve with naturally occurring materials” says Project Coordinator Anna Palau, from the Superconducting Materials and Large Scale Nanostructures (SUMAN) Group at ICMAB-CSIC.

“Tailored metasurfaces will provide effective solutions to improve the efficiency and performance of functional magnetic devices - sensors, actuators, energy harvesters, or wireless power systems” affirms Palau.

About the project

As devices get smaller and smaller, precise control of magnetic fields down to the nanoscale are necessary to improve the performance of devices by the homogeneous concentration of magnetic fields in small and targeted volumes. To achieve a dramatic increase in efficiency, MetaMagIC introduces the design of new magnetic metasurfaces to control low-frequency magnetic fields at the meso/microscale.

The conception, development and implementation of this approach addresses important technological challenges, like: enhancing the sensitivity of magnetic sensors by incorporating them in specially designed planar metamaterials; reducing the negative effects of demagnetizing fields that limit device performance by using metasurfaces, exploiting the non-linear properties of magnetic materials to introduce novel functionalities into magnetic devices such as self-protection of sensitive equipment to damaging high magnetic fields; exploiting the developed metasurfaces to improve the efficiency of small-scale energy harvesting materials with the goal of generating enough energy to operate low-power electronic devices, combining the field expulsion and concentration properties of metasurfaces to optimize a source and receiver pair for high efficiency wireless energy transfer.

About CHIST-ERA

Funding for this project comes from CHIST-ERA, a pathfinder programme for European projects that focuses on research around Information and Communication Technologies. Particularly, MetaMagIC is part of the “Towards Sustainable Information and Communication Technologies” (S-ICT) Programme, an ERA-NET cofund funding scheme. As ICT’s are predicted to consume up to 20 % of the world’s electricity, the CHIST-ERA S-ICT Projects are researching ways to apply a more sustainable approach to all the areas that affect energy consumption in ICT’s, from computing to manufacture and to disposal.

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