



Departamento de  
Física de la  
Materia Condensada  
Universidad Zaragoza

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IKERBASQUE*

## The introduction of topology into real materials...

In this talk I will introduce a newly discovered characterization of insulators, metals and semimetals based on their topological properties. Topological insulators do not conduct in the bulk but, unlike their non-Topological counterparts, exhibit perfect conduction on their surface. Topological metals conduct in the bulk, but, unlike their non-Topological counterparts cannot be gapped due to a special type of protection that allows their low energy electrons to exhibit esoteric phenomena such as chiral anomaly or non-local transport. It was initially thought that the materials exhibiting these phenomena are very special and unique amongst all of the 140000 compounds known to humankind. We will present a review of these ideas and properties of topological materials. We will then show how, using a new theory called Topological Quantum Chemistry, we are able to now catalogue all the topological materials that can possibly exist in nature. We then apply our theory to find that more than 27% of all known compounds -including some of the most interesting materials in nature -are actually topological. We hence live in a topological world!

*Maia García completed her PhD in Physics at the Department of Condensed Matter Physics of Universidad del País Vasco. Afterwards she became postdoctoral researcher at the Lawrence Berkeley National Laboratory. There, she focused on the development of a code for elastic transport calculations. Then she moved to the Max Planck Halle, where Maia started working in topological materials. Nowadays she leads a research group devoted to topological materials at the Donostia International Physics Center, where they develop a database of topological materials in collaboration with Princeton and Max Planck Dresden.*

Sponsored by:



**16<sup>th</sup> of April (Friday)**

**PLACE: Zoom & Youtube (scan code)**

**TIME: 12:30**

