



**October 27<sup>th</sup>, 2022, 14:30**

**Building U5, 1st floor, Seminar Room, via Cozzi 55, Milan**

## **Linear and non Linear Photonics based on Topological Matter**

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After the 2016 Nobel Prize in Physics, topological matter is now becoming a new paradigm in quantum physics and nanotechnology. 3D Topological Insulators (TIs) are the first class of quantum-topological materials ever discovered. They present an insulating gap in the bulk and linearly-dispersive 2-Dimensional Dirac metallic states at the surface [1]. After TIs, many other topological materials have been discovered, including magnetically-ordered 3D topological Insulators, Dirac-, Weyl- and Nodal-semimetals.

In this talk, I will review topological materials properties including their intriguing similitudes with some high-energy physics phenomena [2]. Moreover, I will discuss their linear [3] and non-linear optical properties [4, 5], suggesting some applications in photonics devices.

- [1] J. E. Moore et al., Nature 464, 194 (2010);
- [2] N.P. Armitage et al., Rev. Mod. Phys. 90, (2018);
- [3] L. Tomarchio et al. NPG ASIA Materials, Accepted (2022); [4] F.Giorgianni et al., Nature Commun. 7, 1421 (2016)
- [5] P. Di Pietro et al., Nature Nanotech. 8, 556 (2013);

Progetto PRIN PHOTonics Terahertz devices based on tOpological materials (PHOTO) (CUP: H43C21000080001)

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