



## Introduction to Topological Quantum Theory

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### Summary

This course consists a review about the theory of bands for normal materials up to the theory of bands for topological materials. We unveil the mathematical tools that need to be in use alongside the traditional theory to obtain the topological aspects of the band structure of any material and explain the topological insulators.

Lastly a newly proposed theory named Topological Quantum Chemistry (TQC) will be shown, in which besides topology, the graph theory and the theory of groups, in a scheme that utilizes the descriptions in the real and momentum spaces to explain and predict new topological materials. TQC counts with specialized programs found in the Bilbao Crystallographic Server. We will make a connection to the Server.

### References

Topological quantum chemistry. *Nature*, 547, 298–305 (20 July 2017), doi:10.1038/nature23268

<http://www.cryst.ehu.es>

- 3 theory sessions
- 1 practice session