

# Infrared spectroscopy of Dirac and Weyl semimetals

Florian Le Mardelé

The subject of this thesis are topological semimetals, belonging to three classes: Dirac semimetals, Weyl semimetals, and Dirac nodal line systems.

These materials can have certain exotic properties, through which they mimic relativistic physics. Such properties of topological semimetals may be revealed at low energies, when the linear bands crossing happens near the chemical potential.

The goal of this thesis was to go precisely to such low energies and to seek the characteristic response of topological semimetals. We employed infrared spectroscopy and magneto-optical spectroscopy to shine light on a number of such materials. Using light as a probe, and coupling it to a magnetic field, allowed us to access low energy range with a great precision, and a characteristic optical or magneto-optical response for each material class.

Jury:

Prof. Ana Akrap (thesis supervisor)

Prof. Milan Orlita (external co-examiner)

Prof. Neven Barisic (external co-examiner)

Prof. Christian Bernhard (internal co-examiner)

Prof. Philipp Werner (president of the jury)