



## FIM-S3 SEMINAR

# Spin-orbit coupling: an endless source of complex magnetism

**Monday June 20<sup>th</sup>, 2022 – 11.30**

S3 Seminar Room, 3<sup>rd</sup> floor, Physics building

### Speaker

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### Abstract

During the last decades, the spin-orbit interaction has played an increasingly crucial role in condensed matter physics, thanks to its relevance as a rich microscopic mechanism from the fundamental point of view and as a driving force for innovative spintronic applications on the technological side. Combined with the global thrust towards miniaturization and with the ubiquitous research in two-dimensional (2D) materials, the talk will focus on the modelling of magnets towards the 2D limit. In particular, after a general overview on spin-orbit coupling (SOC) in ferroics, I will focus on the magnetic and ferroelectric properties of transition-metal monolayers (mostly halides) and discuss the role of SOC in the magnetoelectric coupling. The recent reports of multiferroicity in NiI<sub>2</sub> layers [1], obtained via a joint theory-experiments approach down to the single-layer limit, show the potentiality of cross-coupling phenomena in van der Waals magnets.

[1] Song, Q., Occhialini, C.A., Ergecen, E., Ilyas, B., Amoroso, D., Barone, P., Kapeghian, J., Watanabe, K., Taniguchi, T., Botana, A. S., Picozzi, S., Gedik, N., Comin, R., *Evidence for a single-layer van der Waals multiferroic*, Nature **602**, 601 (2022)

**Host:** Marco Gibertini

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