

# NÉEL INSTITUTE Grenoble

## Topic for Master 1 internship – Academic year 2025-2026

### Frustrated Magnetic Oxides: triangle network

#### General Scope:

This internship aims at characterising magnetic systems that are prone to frustration due either to the geometry of the lattice (triangle-based) or to different kinds of interaction in competition. These ingredients may lead to complex magnetic behaviours, far from the long-range order observed in "simple" magnetic systems at low enough temperature (ferromagnetic or antiferromagnetic collinear orders). In frustrated magnetism, complex orders or spin textures (non collinear) can be stabilized, as well as topological and/or chiral features (defects, excitations...), or even an absence of order (disordered spin freezing or spin liquid).

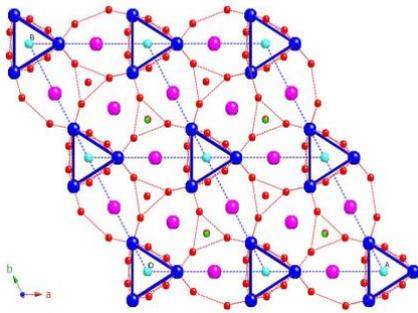


Figure 1: example of network of triangles in  $\text{Ba}_3\text{NbFe}_3\text{Si}_2\text{O}_{14}$

#### Research topic and facilities available:

We aim to study some of these materials, for instance a sample made of magnetic triangles (see figure), by magnetic characterization (magnetization, AC susceptibility, specific heat measurements) and more sophisticated techniques if time permits (spectroscopic techniques). Some modelling can be associated to these studies, for instance the calculation of the crystal field scheme for the magnetic ions or the energy spectrum for the quantum version of the material.

#### Possible collaboration and networking:

The student will use several experimental equipment available in different technical groups and platforms (bulk crystal /Magnetometry / Automatization & characterization) of the Néel Institute. She/he will interact in particular with researchers from the Néel's MagSup (Magnetism and Superconductivity) team.

**Required skills:** Prerequisite in Solid Physics and Magnetism.

**Starting date:** Spring 2026

#### Contact:

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