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THE SEARCH FOR MULTIFERROELECTRICITY: THE CASE OF NICKEL TELLURIDES

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Multiferroic materials exhibiting coupled magnetic and electric orderings are intensely studied due to an interest in both their fundamental properties and potential applications based on the magnetoelectric coupling. In general, magnons are collective spin excitations of various types. In multiferroics, the electric component of the electromagnetic radiation can excite magnons via the dynamic magnetoelectric coupling. These excitations are then called electromagnons; they can be difficult to distinguish from classical magnons. One possible method consists in comparing terahertz or infrared spectra with Raman spectra. In fact, the electromagnons, unlike magnons, must follow the same selection rules as polar phonons—they must be active in both kinds of spectra.
In this presentation, we will illustrate our approach by the study of nickel tellurides [1,2,3]. Indeed, a colossal magnetoelectric coupling has been found in Ni 3 TeO 6 . For the first time, we managed to synthetise its isostructural compounds by substitution of Ni with Mn or Co. Low-temperature spectra revealed electromagnons sensitive to magnetic field, which proves the multiferroic character of the compounds.

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