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**Size effect on lattice and magnetic excitations in BiFeO3 nanoparticles** IAN AUPIAIS, MAXIMILIEN CAZAYOUS, Laboratoire Matriaux et Phnomnes Quantiques — Multiferroics are compounds that show ferroelectricity and magnetism. BiFeO3, by far the most studied, has outstanding ferroelectric properties, a cycloidal magnetic order in the bulk, and many unexpected virtues such as conductive domain walls or a low bandgap of interest for photovoltaics. While this flurry of properties make BiFeO3 a paradigmatic multifunctional material, most are related to its ferroelectric character, and its other ferroic property, antiferromagnetism, has not been investigated extensively, especially in nanoparticles. In this talk, we will bring insight into the rich physics of BiFeO3 nanoparticles with various size through Raman scattering and Transmission Electron Microscopy. We will show how the phonon modes, the spin orders and the spin excitations are modified around the critical size of 66 nm, related to the periodicity of the spin cycloid.

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