

Multiferroics: What now?

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Multiferroic materials, in which magnetic and electric orders coexist, and magnetoelectric materials, in which the magnetic and electric properties are coupled, have been the object of a tremendous scientific excitation in the last ten years for they theoretically unlock paths towards higher density and lower power consuming data storage technologies.

If important discoveries have been done concerning the mechanisms underlying these phenomena, the disappointing amplitude of the observed effects, when compared to what is desired for actual devices, have put down most of the early days enthusiasm concerning these materials. The interest has now shifted towards adjacent fields of research pioneered during the search for enhanced effects. Among the considered issues, one finds the rich physics offered by the interfaces in heterostructures studied in the first place for the possibility they offer to better couple electric and magnetic properties.

However the quest for new multiferroics continues with that construction philosophy, but on much smaller scales, going down to atomic scale tailoring of the materials.

I will present the routes currently considered with both physical and chemical elaboration tools.