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## **ANUNCI SEMINARI:**

***Sala de Graus 2 (Facultat de Ciències)  
21 d'abril de 2016, 11:30h***

### **Multiferroic materials for secure and energy efficient memories**

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During the last decade, in the field multiferroic materials, several systems have shown the coexistence of electric and magnetic order with coupling between them (so-called magnetoelectric coupling). However, the use of this class of materials on commercial electronic devices does not seem to be near. Recent news suggests that the mainstream of electronics industry, i.e. the increase of transistors/bits/... density, will migrate towards more innovative challenges: energy efficiency, connectivity and security. These new challenges can bring the final impulse to the scientific community to achieve the still chimeric commercial multiferroic device.

In the talk, I will revise my bit on multiferroics, introducing some of the systems that I have studied during my career: from single-phase multiferroic materials in a wide range of temperatures to interesting distinct magnetoelectric effects appearing in multiferroic composites. More extensively, I will talk about a hybrid piezoelectric / magnetic structure. In particular, I will talk about PMN-PT/FeRh. PMN-PT is a relaxor ferroelectric with record piezoelectric coefficient. FeRh presents an antiferromagnetic to ferromagnetic transition near above room temperature, which is accompanied by a significant change in its lattice parameters. Thus, one can tune the magnetic order by means electric-field, by modifying the magnetic transition temperature on FeRh via strain coupling between the piezoelectric substrate and the magnetic layer. I will show that one can store information in the FM phase that can be retrieved even after crossing to the AF phase. This memory effect allows to write - hide - retrieve magnetic information isothermally only by means of electric field. I will also talk about unexpected time dependence experiments of magnetization at temperatures right at the middle of FeRh phase transition.