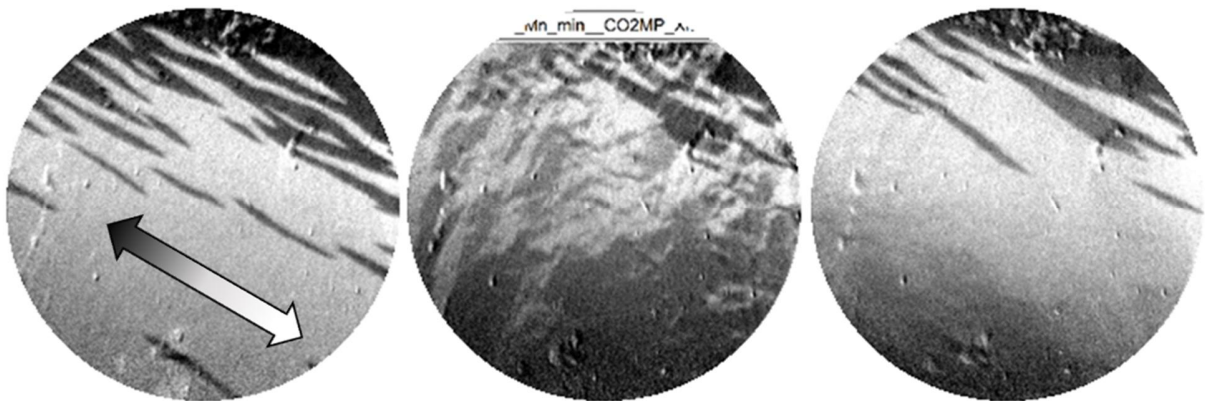


## Imaging electric field induced magnetic switching in PEEM

David Pesquera, Blai Casals, Gervasi Herranz and Josep Fontcuberta from the Institut de Ciència de Materials de Barcelona (ICMAB-CSIC) have used new in-situ electrical poling capabilities at the PEEM microscope to image magnetic switching in a ferromagnetic  $\text{La}_{2/3}\text{Sr}_{1/3}\text{MnO}_3$  (LSMO) thin film. Magnetic microscopy images (XMCD-PEEM) were recorded in different poling states of the PMN-PT piezoelectric substrate, showing reversible switching between different magnetic anisotropies resulting in characteristic domain configurations.



Approaches for magnetic switching triggered by electric fields are considered a promising way to enhance the energy efficiency and information density of magnetic data storage technologies because they can avoid detrimental effects associated to electric current flow like Ohmic losses, heat dissipation and electromigration. While in conventional approaches, electric currents are needed for the generation of Oersted magnetic fields or Spin transfer torque effects, the mechanism investigated in this work is essentially current free.



*Magnetic microscopy images (Field of view 50 $\mu\text{m}$ , XMCD-PEEM at Mn-L3) of the LSMO thin film at the same location: from the left with +240 V, -240 V and again +240 V voltage applied across the piezoelectric substrate. The arrow indicates the direction of the greyscale magnetic contrast.*