

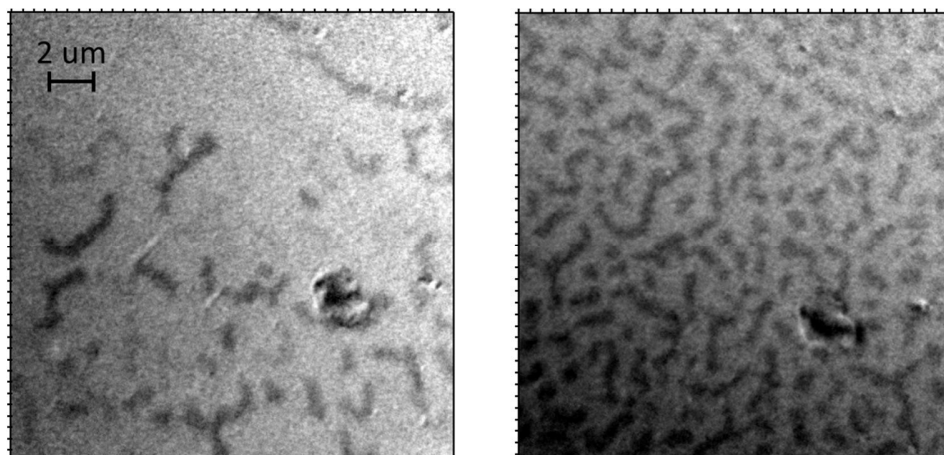
## Magnetic imaging of perpendicular anisotropy material and in-situ magnetic field application

Matteo Cantoni, Lorenzo Baldrati, Christian Rinaldi and Riccardo Bertacco from the Politecnico de Milano have used the CIRCE-PEEM endstation to investigate magneto-electric devices based on a single, 1.1 nm thin, CoFeB layer with perpendicular magnetic anisotropy (PMA) on ferroelectric BaTiO<sub>3</sub>.



*Figure 2: Lorenzo Baldrati (left) and Matteo Cantoni (third from left) with ALBA staff.*

Figure 2 below shows the magnetic configuration of the same part of a sample in different remanent states, exhibiting typical worm-like domains of PMA materials. A new sample holder with in-built electromagnet was used for in-situ magnetization reversal of the samples, allowing us to take images in different remanent states and with magnetic field applied. Due to the near grazing x-ray beam incidence in the PEEM, the realization of out-of-plane magnetic contrast is more challenging than in-plane contrast. Future studies will address the influence of the ferroelectric BaTiO<sub>3</sub> on the magnetic switching of the top CoFeB structure.



*Figure 2: XMCD-PEEM image taken at the Fe-L<sub>3</sub> absorption edge of a CoFeB layer in two different remanent states. The grey scale contrast corresponds to the direction of the perpendicular magnetization (up or down), and arises from the different projections on the photon beam illuminating the sample under 16° grazing incidence.*