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**New chemical and magnetic structure at the domain walls of an epitaxial oxide** SAEEDEH FAROKHIPOOR, University of Groningen, Netherlands, C. MAGEN, Universidad de Zaragoza, Spain, S. VENKATESAN, Universitat Munchen, Germany, J. INIGUEZ, ICMAB-CSIC, Spain, C.J.M DAUMONT, D. RUBI, University of Groningen, Netherlands, E. SNOECK, CEMES - CNRS, France, M. MOSTOVOY, C. DE GRAAF, University of Groningen, Netherlands, A. MULLER, M. DOBLINGER, C. SCHEU, Universitat Munchen, Germany, B. NOHEDA, University of Groningen, Netherlands — Domain walls (DWs) in multiferroic thin films are nanoscale regions presenting different properties compared to the adjacent domains. This distinct behavior originates from the broken crystal symmetry and intense strain gradients around the walls. Therefore, engineering and controlling the properties of DWs in different types of functional materials, in particular in complex oxides, can become a promising path to design and tailor novel nanoelectronic and spintronic devices. In $TbMnO_3$, an antiferromagnetic orthorhombic perovskite in bulk form, ferroelastic DWs can also be achieved in a very controlled way, with densities that increase inversely proportional to the film thickness, such that for the thinnest films, the volume fraction of DWs can become up to 25% of the total film volume. These DWs, display a net magnetic moment that originates in a unique chemical environment: a novel Mn coordination has been locally synthesized due to the local stress present at the DWs. We believe that this method can be applied more generally to obtain embedded 2D ferromagnetic sheets of interest in electronics and spintronics. S. Farokhipoor, et al., Nature (20.Nov.2014).

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