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**New structural features in solution-derived YBCO nanocomposite films responsible for a successful novel pinning mechanism** J. GAZQUEZ, R. GUZMAN, ICMAB-CSIC, Spain, J. SALAFRANCA, Universidad Complutense de Madrid, Spain, R. MISHRA, Vanderbilt University, USA, M. VARELA, Materials Science and Technology Division, ORNL, USA, A. PALAU, V. ROUCO, M. COLL, A. LLORDES, ICMAB-CSIC, Spain, G. DEUTSCHER, Tel Aviv University, Israel, X. OBRADORS, T. PUIG, ICMAB-CSIC, Spain — The optimization of high temperature superconductors calls for a detailed knowledge about the effects of materials' manipulations on the subnanometer scale, since the subtle interplay of a variety of nanoscale defect structures that pin the magnetic flux lattice will dictate the performance of these materials. The outstanding properties of solution deposited-$YBa_2Cu_3O_{7-d}$ nanocomposites arise from the strains associated to the network of $YBa_2Cu_4O_8$ intergrowths emerging from the spontaneously segregated oxide nanoparticles, and a novel pinning mechanism coupling this lattice strain with superconducting pairing [1]. However, $YBa_2Cu_4O_8$ intergrowths involve the addition of an extra CuO chain and their ubiquity may lead to an off-stoichiometry that could jeopardize the superconducting properties of the film. Conversely, we will show, by means of aberration corrected scanning transmission microscopy in combination with electron energy loss spectroscopy, how the system balance this deficiency of Cu through new structural features, previously unforeseen, that may constitute new and effective pinning centers and may be responsible for the novel pinning mechanism proposed.

[1] A. Llordes *et al* Nature Mater2012.

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