STRUCTURE, TRANSPORT AND MAGNETIC CHARACTERIZATION OF La$_{0.89}$Sr$_{0.11}$MnO$_3$/YBa$_2$Cu$_3$O$_7$ SUPERLATTICES

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We report on structural, transport and magnetic studies of La$_{0.89}$Sr$_{0.11}$MnO$_3$/YBa$_2$Cu$_3$O$_7$ (LSMO/YBCO) superlattices. For this doping level (x=0.11) the LSMO system is a ferromagnetic insulator (FMI). Proximity effect between a ferromagnetic insulator and YBCO system is very interesting problem, both for fundamental research and application. A series of LSMO/YBCO superlattices have been fabricated using a high pressure sputtering, with fixed LSMO layer thickness at 8 unit cells (u.c.) and varying YBCO layer thickness from 1 to 8 u.c. $c$–axis layer thickness. An onset of superconducting transition is observed beginning from the samples with 2 u.c. YBCO layer thickness. Magnetization hysteresis curves measured close to superconducting transition show interplay between Meissner currents in YBCO layers and magnetic field present in LSMO layers.

Subject category:
2. Magnetic Films, Surfaces, Multilayers and Nanostructures

Presentation mode:
poster

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