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Scaling roughness and transport properties correlation in manganite thin films[1] JUAN RAMíREZ, MARIA ELENA GÓMEZ, WILSON LÓPERA, PEDRO PRIETO, Departamento de Física, Universidad del Valle, GRUPO DE PELíCULAS DELGADAS TEAM — A scaling roughness study was done on digitized Atomic Force Microscope (AFM) images of $La_{2/3}Ca_{1/3}MnO_3$ thin films grown on (100) oriented $SrTiO_3$ substrates. The films were grown via sputtering technique at high oxygen pressures (mbar) and at substrate temperatures of 850 °C. The films were characterized by resistivity measurements to determine the Curie temperature by the transition temperature from insulating to metallic phase. From digitized AFM-images and by using a specific self-designed algorithm, we statistically study the scaling roughness properties. We obtain quantitative values for the roughness parameters: interface width (σ), correlation length (ξ), and roughness exponent (α). The calculated α-values are 0.85 ± 0.05, indicating a highly oriented growth mechanism. We analyzed the dependence of layer thickness (d) and image size (D) with the parameters describing roughness and founded that Curie-Temperature is correlated with the lateral correlation length whereas there is no correlation with the saturation roughness.

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