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Introduction and motivation

NNO thin film grown on LaAlO_3 (LAO) feature an insulator-to-metal transition (IMT) that can be electrically induced. It is known that the voltage triggered IMT takes place in a filamentary fashion, but it is unclear what influences the characteristic lengthscales of the process, and what are its high resolution features. We study the temperature dependence of the filament to elucidate these questions using scattering-type scanning near-field optical microscopy (s-SNOM).