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***in situ* Electron Holography for Electromagnetic Analysis at Nanoscale** ARTURO PONCE, FERNANDO MENDOZA, JESUS CANTU, JOHN EDER SANCHEZ, Univ of Texas, San Antonio, MICROSCOPY OF SOLIDS TEAM — Electron holography provides powerful information about not only morphology and size of individual nanostructures but electromagnetic behavior around and within the structures. Quantitative measurements can be done to characterize the magnetic and electric properties in these structures. In addition, be stimulating with external signals we can study their response and important characteristics of the structures. In the current work, the magnetic contribution of the objective lens in magnetic nanostructures studied under Lorentz conditions and by applying a magnetization reversal process. In addition, the active reception/transmission behavior of ZnO/Ag nanoantennas has been mapped simultaneously under an in-situ radio frequency signal by electron holography and phase reconstruction. Time evolution of the radiation pattern was recorded varying the amplitude from 0 to 5 volts and a modulated frequency from 1 to 10 MHz. The phase maps show the distribution of the electric field surrounding individual nanoantennas. This is the first evidence in which electron holography is used to study the multidirectional radiation pattern on an active nanoantenna element.

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