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Nota di contenuto	Introduction -- Imaging the Magnetic Near-eld of Plasmon Modes in Bar Antennas -- A Near-Field-Aperture Probe as an Optical Magnetic Source and Detector -- Magnetic Near-Field Imaging of Increasingly Complex Plasmonic Antennas -- Plasmon-Enhanced Sub-wavelength Laser Ablation: Plasmonic Nano-Jets -- Conclusions and Outlook.
Sommario/riassunto	This thesis focuses on a means of obtaining, for the first time, full electromagnetic imaging of photonic nanostructures. The author also develops a unique practical simulation framework which is used to confirm the results. The development of innovative photonic devices and metamaterials with tailor-made functionalities depends critically on our capability to characterize them and understand the underlying

light-matter interactions. Thus, imaging all components of the electromagnetic light field at nanoscale resolution is of paramount importance in this area. This challenge is answered by demonstrating experimentally that a hollow-pyramid aperture probe SNOM can directly image the horizontal magnetic field of light in simple plasmonic antennas – rod, disk and ring. These results are confirmed by numerical simulations, showing that the probe can be approximated, to first order, by a magnetic point-dipole source. This approximation substantially reduces the simulation time and complexity and facilitates the otherwise controversial interpretation of near-field images. The validated technique is used to study complex plasmonic antennas and to explore new opportunities for their engineering and characterization.