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A novel near field transducer for efficient energy transfer WILLIAM CHALLENER, AMIT ITAGI, CHUBING PENG, NILS GOKEMEIJER, GANPING JU, MICHAEL SEIGLER, EDWARD GAGE, Seagate Technology — Interest in the localized surface plasmon resonance (LSPR) of metallic nanoparticles has been piqued by single molecule detection in surface enhanced Raman spectroscopy, scanning optical microscopy with sub-20 nm resolution, particle capture using the optical tweezers effect, and proposed applications in nanolithography and data storage. We have designed a gold near field transducer (NFT) that combines the LSPR effect, the lightning rod effect, and the dual dipole effect. Optical energy that is focused onto the NFT is coupled into a metallic thin film within a spot that is an order of magnitude smaller than the free space wavelength with an efficiency of about 5%. With approximately 40 mW of optical power from a laser diode at a wavelength of 830 nm, data has been recorded at a track width less than 50 nm onto a high coercivity magnetic medium by heating it to its Curie point of 650 K while the medium was rotating at 2700 RPM and the NFT was separated from the medium surface by 15 nm.

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