

Abstract Submitted
for the MAR05 Meeting of
The American Physical Society

Experimental characterization of magnetic surface plasmons on
JONAH GOLLUB, DAVID SMITH, Duke University, DAVID VIER, TIM PER-
RAM, UCSD, JACK MOCK, DAVID SCHURIG, Duke University — We examine
the surface plasmons (SPs) that exist at the interface between air and a metamaterial constructed of split ring resonators (SRRs). The SRR metamaterial possesses a frequency band in the microwave regime (12.5 - 14 GHz) over which the permeability is negative. We apply an attenuated total reflection technique in the Otto configuration (OATR) to excite and probe the surface plasmons. A beam of microwaves is reflected from a higher dielectric (Polycarbonate) prism. Resulting evanescent microwave fields on the transmission side of the prism couple to SPs on the metamaterial and are indicated by a dip in the reflected power. The experimental data is compared with analytic solutions in which the metamaterial slab is approximated as an infinite half-space. The frequency-dependent permeability (and permittivity) of the SRRs is derived from finite-element simulations on an SRR structure with the same parameters as that measured.

Jonah Gollub
Duke University

Date submitted: 03 Dec 2004

Electronic form version 1.4