Experimental characterization of magnetic surface plasmons on
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the surface plasmons (SPs) that exist at the interface between air and a metamate-
rial 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 config-
uration (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 meta-
material 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.

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