

Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

Symmetric and Asymmetric Split Ring Resonators for Biosensing at Terahertz Frequencies¹ GUILLERMO NARANJO, XOMALIN PERALTA, Univ of Texas, San Antonio — Food allergies have become a major health concern around the world. Peanut allergies are particularly important because they affect over 5 million people in the United States. We are proposing to develop a metamaterial-based sensor for peanut allergens. The detection mechanism we will tap into is the change in a metamaterial's resonant response due to the presence of a biomolecule in the gap region. Using a commercial-grade simulator based on the finite-difference time-domain method, we have simulated the terahertz transmission and reflection spectra of three different split-ring resonator designs with and without a biomolecule present. By modifying the overall symmetry of the resonator and the geometry of the gap region, we have modified the resonant response and increased its sensitivity. The increased sensitivity is demonstrated by repeating the simulations with a layer of peroxidase conjugated immunoglobulin G (PX-IgG) in the gap region and quantifying the resulting resonant shift. These results are the basis for the proposed allergen sensors.

¹UTSA MBRS-RISE Research Training Program.

Guillermo Naranjo
Univ of Texas, San Antonio

Date submitted: 14 Nov 2014

Electronic form version 1.4