

Abstract Submitted  
for the MAR11 Meeting of  
The American Physical Society

**Electromagnetism in multicoaxial negative-index metamaterial cables** BAHRAM DJAFARI-ROUHANI, University of Science & Technology of Lille1, France, MANVIR KUSHWAHA, Rice University — By using an elegant Green [or response] function theory, which does not require matching of the messy boundary conditions, we investigate the surface plasmon excitations in the multicoaxial cylindrical cables made up of negative-index metamaterials. The multicoaxial cables with *dispersive* metamaterial components exhibit rather richer (and complex) plasmon spectrum with each interface supporting two modes: one TM and the other TE for (the integer order of the Bessel function)  $m \neq 0$ . The cables with *nondispersive* metamaterial components bear a different tale: they do not support simultaneously both TM and TE modes over the whole range of propagation vector. The computed local and total density of states enable us to substantiate spatial positions of the modes in the spectrum. Such quasi-one dimensional systems as studied here should prove to be the milestones of the emerging optoelectronics and telecommunications systems.

Manvir Kushwaha  
Rice University

Date submitted: 22 Nov 2010

Electronic form version 1.4