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**Numerical band structure calculations of plasma metamaterials** DYLAN PEDERSON, KONSTANTINOS KOURTZANIDIS, LAXMINARAYAN RAJA, The University of Texas at Austin — Metamaterials (MM) are materials engineered to display negative macroscopic permittivity and permeability. These materials allow for designed control over electromagnetic energy flow, especially at frequencies where natural materials do not interact. Plasmas have recently found application in MM as a negative permittivity component. The permittivity of a plasma depends on its electron density, which can be controlled by an applied field. This means that plasmas can be used in MM to actively control the transmission or reflection of incident waves. This work focuses on a plasma MM geometry in which microplasmas are generated in perforations in a metal plate. We characterizethis material by its band structure, which describes its interaction with incident waves. The plasma-EM interactions are obtained by coupling Maxwell's equations to a simplified plasma momentum equation. A plasma density profile is prescribed, and its effect on the band structure is investigated. The band structure calculations are typically done for static structures, whereas our current density responds to the incident waves. The resulting band structures are compared with experimental results.

Dylan Pederson
The University of Texas at Austin

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