

## **Incorporating Bianisotropy in Effective Models of Metamaterials**

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Since the advent of metamaterials, many groups have noted the effects of bianisotropy in metamaterials wherein the electric displacement and magnetic induction depend on both the electric and magnetic fields. In this talk, we survey the origins of this and discuss a retrieval method for effective bianisotropic parameters of metamaterials, which we have implemented using the CGMX Maxwell solver in the Overture software suite. When applied to a "conglomeration" of metamaterial blocks, this yields Maxwell equations with both dispersive and bianisotropic effects, and these are solved as a hyperbolic system with a method of lines implementation. This is joint work with the research groups of Prof. William Henshaw at RPI, Prof. Alexander Kildishev at Purdue, and Prof. Douglas Werner of Penn State.