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Tunability of Effective Properties of Optical Metamaterials

Abstract: Metamaterials are artificially designed materials with exotic properties that are not inherently found in nature. Theory of partial differential equations plays an important in the problem of designing metamaterial crystals with double negative effective properties for applications in optics. This is done by investigating the conditions necessary for generating novel dispersion properties in a metamaterial crystal with subwavelength microstructure, and it also provides novel optical properties created through local resonances tied to the geometry of the media in subwavelength regime. In this talk, by outlining an approach for homogenization of partial differential equations, we mainly focus on demonstrating tunability of novel properties of metamaterial crystals.

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