

Engineering the Dispersive Properties for Meta-Material Crystals

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We present an approach for designing negative index meta-material crystals. The class of meta-material crystals discussed here is envisioned for optical applications and consists of high dielectric inclusions covered with metallic coatings. In this presentation we apply a new type of convergent power series expansion for electromagnetic fields inside meta-material crystals. The leading order theory provides a basis for engineering negative index frequency ranges across which the phase velocity of propagating waves oppose the direction of electromagnetic power flow. We will discuss the effects of loss and crystal geometry on the frequency ranges over which negative index phenomena occur.