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OPTICAL SPECTRA OF A MULTILAYER STACK COMPOSED OF HIGH-TEMPERATURE SUPERCONDUCTOR AND DIELECTRIC SILVIA CORTES-LOPEZ, FELIPE PEREZ-RODRIGUEZ, Benemerita Universidad Autonoma de Puebla — Layered high-temperature superconductors behave as negative-refractive-index hyperbolic metamaterials, having effective permittivity components, parallel and perpendicular to the superconducting planes, with different infrared Josephson plasma frequencies [1]. Here, we theoretically study the reflectivity and transmissivity of a multilayer stack with alternating high-temperature superconductor and dielectric slabs. For TM electromagnetic waves, it was found that both reflectivity and transmissivity exhibit narrow photonic pass bands corresponding to two types of Fabry-Perot resonances, one occurring in the superconductor, whereas the other in the dielectric slab. For a stack of N unit cells, in each narrow photonic pass band there are N-1 transmissivity peaks, associated to the quantization of the Bloch phase within the stack. In contrast, when both types of Fabry-Perot resonances are close to each other, the infrared pass bands become wide and the N-1 strong peaks in the optical spectra are clearly-separated. In addition, new resonances are observed at the top and the bottom of the pass bands, and a photonic band just below the lower Josephson plasma frequency appears.
A.L. Rakhmanov, et al, Phys. Rev. B **81**, 075101 (2010).

Silvia Cortes-Lopez
Benemerita Universidad Autonoma de Puebla

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