

Unidirectional Resonant Absorption in a Lossy Superconducting Photonic Crystal

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This work is aimed to theoretically study unidirectional resonant absorption in a defective and lossy superconducting photonic crystal (SPC). The considered finite SPC is $(AB)^M D (BA)^N$, in which A and D are dielectrics, B is a superconductor, and M, N are the stack numbers, respectively. It is found that the absorptance shows an unidirectional property at a certain resonant frequency. The number of resonant frequencies can be increased as the difference between M and N increases. This unidirectional resonant absorption is shown to belong to an antiresonance according to the frequency response of effective surface impedance calculation. Additionally, the shift in the resonant frequency is found to be nearly polarization-independent in the case of oblique incidence.

Keywords: Unidirectional absorption, photonic crystals, superconductors, transfer matrix method