

Optical properties of a superconducting annular periodic multilayer structure

Mei-Soong Chen, Chien-Jang Wu, 楊宗哲

Electrical Engineering

Engineering

yangtj@chu.edu.tw

Abstract

The optical properties of a superconducting annular Bragg reflector (SABR) are theoretically investigated based on the transfer matrix method for the cylindrical waves. For TM wave at an azimuthal mode number, $m \geq 1$, it is found that there exist some novelties compared with the usual superconducting planar Bragg reflector (SPBR). An additional high-reflectance band is seen and some reflection dips near the threshold wavelength of a superconductor are generated as well. These two special results arising from the higher order azimuthal mode of the cylindrical waves are not found in the SPBR. The results suggest that the SABR could be used to design a narrowband transmission filter or an annular resonator without introducing any physical defect layer in the structure.

Keyword : superconducting annular Bragg reflector, cylindrical waves, azimuthal mode, transfer matrix