PRELIMINARY STUDY OF BULK NIOBIUM SUPERCONDUCTIVE PHOTONIC BAND GAP ACCELERATING CAVITY

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Abstract

Photonic Band Gap (PBG) structures can be designed and realized to build quasi monomodal accelerating cavities operating in the microwave region. In a 2D PBG a periodic pattern of metallic rods arranged in a hexagonal lattice reproduces for the electric field the conditions existing for the electrons in a real crystal. PBG structures are characterized by a bandgap, i.e. a frequency region in which field propagation is forbidden. Introducing a defect in the structure, i.e. a missing rod, there is a propagation mode localized inside the bandgap, this “defect mode” determines an allowed state inside the bandgap surrounded by a region in which no propagating modes can exist and can be excited in order to create an accelerating field inside the cavity. In this paper we present the preliminary results for prototypes with a defect mode localized at 6 GHz. Cavities present a sharp resonant peak localized at the defect and no high order modes in the frequency range covered by the power supply.

NO SUBMISSION RECIEVED