Photonic properties of disordered porous materials

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In recent years, an increasing effort is dedicated to study photonic properties of porous materials that potentially can be employed as photonic crystals [1,2]. Among these, random porous media in which the sizes and the shapes of pores spread in large ranges of values, may be considered as representatives of amorphous photonic structures, and employed as useful models to study the effect of rather large degree of disorder on both propagation and localization of the light.

In this work we discuss the photonic properties of very disordered threedimensional dielectric structures. In particular the shape of the photon density of states (DOS) and the presence of photonic pseudo band-gaps, calculated in structural models of



porous media by using a Large Unit Cells approach, will be reported and discussed in relation to the different pore distributions. Moreover photonic bands calculated in different models of 1-D, 2-D and 3-D superlattices obtained by assembling layers of different porosity are also reported and briefly discussed.

References

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