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Resonance energy transfer rate in the presence of a cylindrical photonic band-gap structure*

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The resonance energy transfer rate between an excited atom and a ground-state one depends on various factors such as the matching between the donor and acceptor wavelengths, location of the atoms, and the environment that surrounds them. We investigate the interatomic resonance energy transfer rate in the presence of a cylindrical dielectric multi-layer structure using the Green's tensor formalism. The permittivities of the layers are interchanged periodically between low and high values, so as to create a photonic band-gap system in the radial direction. We present results for atoms situated in a cross section normal to the cylinder axis. The contrast between low and high permittivities is varied to elucidate the effect of the band-gap structure. Furthermore, the results are compared with those for atoms located near a perfectly reflecting cylinder.

Keywords: resonance energy transfer, cylindrical system, photonic band gap.

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