

Strong Suppression of Radiation States in a Slab Waveguide Sandwiched between Omnidirectional Mirrors

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Abstract: Structures in channel or slab waveguides, applied deliberately or due to imperfections, may lead to strong modal losses, corresponding to the excitation of radiation modes. As an example, losses are generally very large in slab photonic crystal (PhC) impurity waveguides (WGs) due to the combined effect of field enhancement and fabrication errors. In the presentation it is shown that for a silicon slab in air such radiation losses can be strongly reduced, by approximately one order of magnitude, by structural optimization of such a slab sandwiched between two omni-directional mirrors. The effect can be used for the production of low loss PhC impurity WGs, high Q-cavities and low-loss transitions between different WG sections.

Keywords: photonic crystals, photonic bandgap, high Q, cavities, low loss.