

## 2D PCs for spontaneous emission and mode control, and vice-versa

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While the initial motivation for photonic crystal was spontaneous emission control, the need to miniaturize optical signal has led to contemplate the use of 2D photonic crystals. Fig.1 shows an example of compact PhC-based device for wavelength monitoring. The unique ability of this system to combine momentum conservation in all directions, without sacrificing confinement, will be discussed.

Yet, the same systems help pursuing the more fundamental quest of emission control. In particular, their dispersion relation and density of states (Fig.2) indicates that extended systems may support the Purcell effect due to their singular photon DOS. Various evidences of this spontaneous emission enhancement will be discussed, based on photoluminescence measurements. Last, the possible good use of gain, of its enhancement and of nonlinearities with active medium inserted in these waveguides will be discussed in the framework of the FP6-IST-004582 FUNFOX European project.

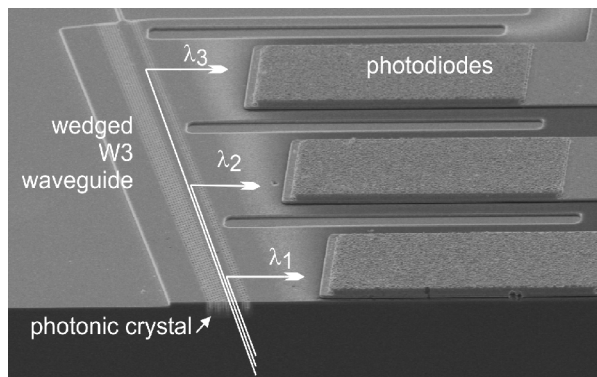


Figure 1 : demultiplexer with integrated photodiodes

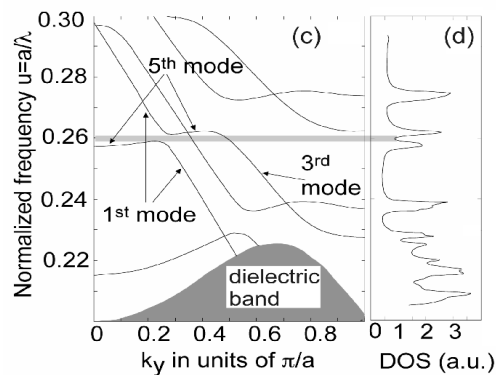


Fig.2: Dispersion relation (c) and in-plane density of states (d) of the W3 waveguide