**Optical coupling of double L7 photonic crystal microcavities for applications in quantum photonics**

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## Abstract

Coupled photonic crystal microcavities have been considered when exploring platforms for quantum photonic effects like quantum-optical Josephson interferometers, [1] single photon emitters and coupled-cavity single-photon emitters [2] and many others [3]. Arrays of photonic cavities are relevant structures for developing large-scale photonic integrated circuits, single mode coupled-cavity lasers [4] and for investigating basic quantum electrodynamics phenomena due to the photon hopping between interacting nanoresonators [5]. In this work we have measured the emission of two L7 microcavities when the distance between them (the number of rows of holes) is varied (Figure 1). We have found optical shared modes ("supermodes") that appear more clearly at a certain distance of separation. Finally we have simulated the optical mode distribution of the coupled system using the GME method, finding a good agreement between experiment and theory.

## References

[1] D. Gerace et al., *Nature Physics* **5**, 281 - 284 (2009)
[2] M. Maragkou et al. Physical Review B, 86 (7), 085316 (2012)
[3] J.L. O'Brien et al. *Nature Photonics* **3**, 687 - 695 (2009)
[4] J. Huang et al. APL 99 (2011)
[5] N. Caselli et al. *ACS Photonics*, **2015**, *2* (5), pp 565–571

## Figures

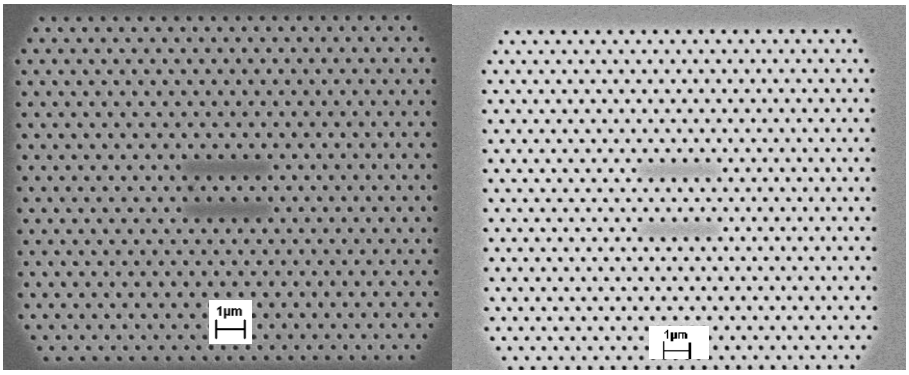


Figure 1. Two L7 photonic crystal microcavities separated by 3 and 5 rows of holes.