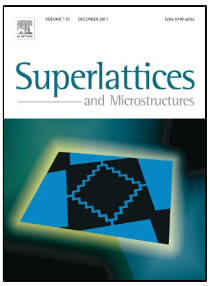
Accepted Manuscript



Superradiant phase transition with graphene embedded in one dimensional optical cavity

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PII:	S0749-6036(17)32520-X
DOI:	10.1016/j.spmi.2017.11.020
Reference:	YSPMI 5355
To appear in:	*Superlattices and Microstructures*
Received Date:	20 October 2017
Accepted Date:	13 November 2017

Please cite this article as: Benliang Li, Tao Liu, Daniel W. Hewak, Qi Jie Wang, Superradiant phase transition with graphene embedded in one dimensional optical cavity, *Superlattices and Microstructures* (2017), doi: 10.1016/j.spmi.2017.11.020

Highlights of the paper

In this paper, we present a microscopic theory to describe the physics of graphene imbedded in a one dimensional (1D) optical cavity under a perpendicular magnetic field. There are two points we need to highlight for our paper.

1. We, for the first time, calculate out the complete excitation spectrum in both the normal phase and superradiant phase regimes.
2. The dispersion relation of polaritons show that the multimode coupling of cavity photon with the cyclotron transition, in contrast to the single mode case, can greatly reduce the critical vacuum Rabi frequency required for quantum phase transition, and dramatically enhance the superradiant emission by fast modulating the Hamiltonian.