Abstract Submitted
for the DAMOP10 Meeting of
The American Physical Society

Phase Space Engineering in Optical Microcavities I. Preserving near-field uniformity while inducing far-field directionality[1] G. PAINCHAUD-APRIL, J. POIRIER, D. GAGNON, L.J. DUBÉ, Laval University, Quebec (Canada) — Optical microcavities have received much attention over the last decade from different research fields ranging from fundamental issues of cavity QED to specific applications such as microlasers and bio-sensors. A major issue in the latter applications is the difficulty to obtain directional emission of light in the far-field while keeping high energy densities inside the cavity (i.e. high quality factor). To improve our understanding of these systems, we have studied the *annular cavity* (a dielectric disk with a circular hole), where the distance cavity-hole centers d is used as a parameter to alter the properties of cavity resonances. We will present results showing how one can affect the directionality of the far-field while preserving the uniformity (hence the quality factor) of the near-field simply by increasing the value of d. Interestingly, the transition between a uniform near- and far-field to a uniform near- and directional far-field is rather abrupt. We can explain this behaviour quite nicely with a simple model, supported by full numerical calculations, and we predict that the effect will also be found in a large class of eigenmodes of the cavity.

[1]We are grateful to NSERC (Canada) and FQRNT (Québec) for financial support.

Louis J. Dubé
Université Laval

Date submitted: 27 Jan 2010 Electronic form version 1.4