PROGECIB-5A, GOVERN BALEAR

QUANTUM LIGHT IN MICRODEVICES

QULMI

IP: ROBERTA ZAMBRINI

IFISC

CSIC UIB

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funding institution

BOIB 19 X 2006: projects of the Government of Balearic Islands *to promote research in science and technology*

→ *Program a) "to promote young researchers groups and emerging groups"*

duration

2 years: from January 2007 to December 2008

budget

33.000 euros →

20.000 euros in 2007

13.000 euros in 2008

team

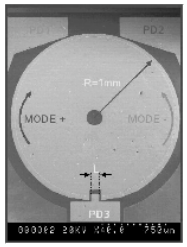
Roberta Zambrini, Pere Colet, Damià Gomila, Alessandro Sciré, Andrián Jacobo, Antonio Pérez, María Moreno

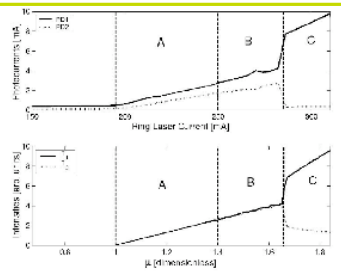
program

Study of quantum correlations and possibility of noise control in optical devices

Three specific objectives:

- *Characterisation of noise and correlations in semiconductor ring laser*
- *Dynamics and quantum effects in metamaterials and photonic crystals*
- *Quantum effects in presence of synchronisation*



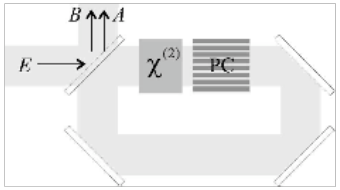


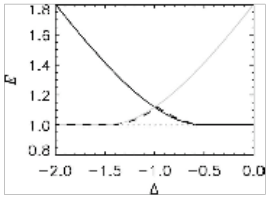
Looking for quantum effects in a semiconductor ring laser in the bidirectional regime, where two counterpropagating modes are coupled due to backscattering.

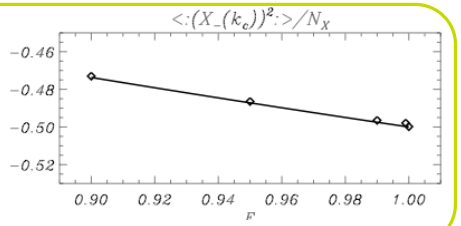
A. Perez, R. Zambrini, A. Sciré, P. Colet

Photonic crystals can be used to cotrol spatial instabilities. Which are the effects on quantum correlations?

M. Moreno, R. Zambrini, D. Gomila, P. Colet







1. Subcritical patterns and dissipative solitons due to intra-cavity photonic crystals. Gomila, Oppo, Physical Review A **76**, 043823 (2007)
2. Dynamics of hexagonal patterns in a self-focusing Kerr cavity. Gomila, Colet, Physical Review E **76**, 016217 (2007)
3. Signal amplification and control in optical cavities with off-axis feedback. Zambrini, Papoff, Physical Review Letters **99**, 063907 (2007)
4. Angular momentum of multimode and polarization patterns. Zambrini, Barnett, Optics Express **15**, 15214 (2007)
5. Bistability and all-optical switching in semiconductor ring lasers. Perez, Scirè, Van der Sande, Colet, Mirasso, Optics Express **15**, 12941 (2007)
6. Elementary Excitations of a Bose-Einstein Condensate in an Effective Magnetic Field. Murray, Barnett, Ohberg, Gomila, to be published
7. Dynamical instabilities of dissipative solitons in nonlinear optical cavities with nonlocal materials, Gelens, Gomila, Van der Sande, Danckaert, Colet, Matías, to be published
8. Measuring the Complete Transverse Spatial Mode Spectrum of a Wave Field, Calvo, Picon, Zambrini, to be published
9. A new technique for inertial rotation sensing using a semiconductor ring laser. Pérez, Scirè, in preparation.
10. Effects of an addressing Gaussian beam on the dynamics of dissipative solitons, Jacobo, Gomila, Matías, Colet, in preparation.
11. Correlations in semiconductor ring laser in the bidirectional regime, Perez, Zambrini, Sciré, Colet, in preparation.

Correlations in semiconductor ring laser in the bidirectional regime. Antonio Pérez S., **Memoria del Máster en Física 2006-2007 (UIB)**