NTNU

Innovation and Creativity

Undergraduate and graduate course on

QUANTUM OPTICS

TFY 4292

(Coordinate with the old Ph.D Course FY8300)

Autumn 2006

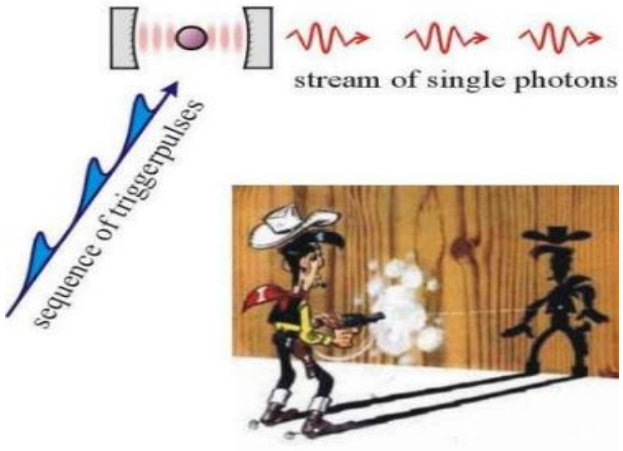
Physical and practical applications of quantum optics will be the main ingredient in this course. Heavy formalism will be avoided as far as possible. The students may be assigned projects during the course. For graduate students these projects may be in accordance with their research interests. The contents will be :

- **Quantum Theory of Radiation**
- **Squeezing of Quantum States**
- **Quantum Theory of Coherence and Photon-Photon Interferometry**
- **Cavity Quantum Electrodynamics**
- **Non-Linear Quantum Optics - Parametric Amplification**
- **Master Equations - The Quantum Theory of Damping**
- **Physics of Quantum Information**
- **Cloning in Quantum Mechanics and Quantum Cryptography**
- **Quantum Computers**
- **Experimental Methods and Recent Results in Quantum Optics**

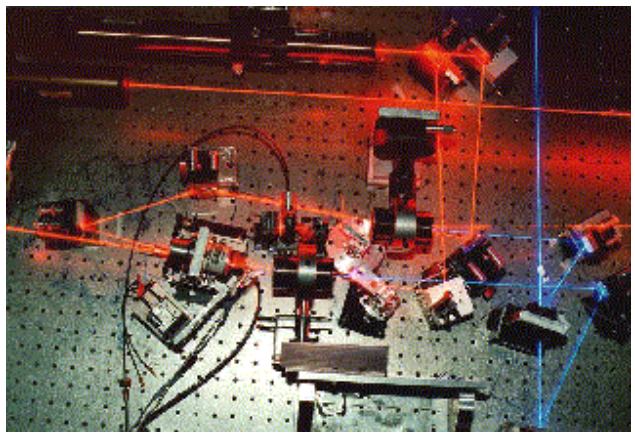
- **The course will be lectured 5 hours a week during one semester including one to two hours for exercises. The exam will be written and it is expected that participants solve a set of obligatory problems given during the course.**

Recommended literature: Lectures notes and selected articles which covers the complete course will be provided. Students are recommended to use C.C. Gerry and P.L. Knight, *Introductory Quantum Optics* (Cambridge University Press, 2005). We also recommend M.O. Scully and M.S. Zubairy, *Quantum Optics* (Cambridge University Press, 1997) and L. Mandel and E. Wolf, *Optical Coherence and Quantum Optics* (Cambridge University Press, 1995) as references.
Interested participants should contact Professor Bo-Sture Skagerstam for more information (email: Bo-Sture.Skagerstam@phys.ntnu.no or phone (735) 91866) .

The first meeting takes place Monday August 21:th at 12.15-14.00, in Room R55.



A photon gun can be made in real life!



Photon - photon correlation experiments at the University of Rochester.