



# Physics Seminar

**Gerd Leuchs**

Director of Max-Planck research center for Optics, Photonics and Information, University of Nürnberg-Erlangen, Germany

**Title: Is spontaneous emission reversible?**

**Time: Wednesday, February 7, 13:00-14:00**

**Place: Building 306, auditorium 38**

Can a single photon interact with a single atom in such a way that the absorption probability is 'one'? Surprisingly, the answer is yes independent of whether the transition matrix element is small or large. There are of course pre-conditions, concerning e.g. the geometry of the wave fronts, the line width of the photon and last not least the polarization. As a general rule of thumb it is helpful to study the inverse process of photon emission and to use the symmetry of quantum systems with respect to time reversal [1]. The field distribution which couples best to an atom also leads to the smallest focal spot in free space [2], with possible implications to other optical systems [3].

[1] S. Quabis, R. Dorn, M. Eberler, O. Glockl, G. Leuchs, *Opt. Commun.* 179, 1-7 (2000)

[2] R. Dorn, S. Quabis, G. Leuchs, *Phys. Rev. Lett.* 91, 233901(2003)

[3] G. Leuchs, S. Quabis, *J. Mod. Opt.* 53, 787-797 (2006)

**Coffee and tea will be served 15 min before the seminar.**

**Organisers: Anders Andersen, Ulrik L. Andersen and Thomas Bligaard**