30.10. *Photon Antibunching in Resonance Fluorescence.* H. J. Kimble, M. Dagenais, and L. Mandel**.** *Phys. Rev. Lett.* **39**, 691 (1977)

Presenter (10 min):
Sketch the key results. 3 slides at maximum!
Bibliometrics: what do you know about the authors and impact of the paper?
Based on the bibliometrics, do you think the paper is a milestone?

1. Try to find a simple definition of the term “photon.”

2. What is the statistical property of light emitted by thermal equilibrium/laser sources?

3. What property does the joint probability function of a classical ergodic process have?

4. What is said to be an explicit feature of a quantum field?

5. Why is Einstein’s nobel explanation if the photo-electric effect (E = hf) insufficient to proof the quantum nature of the electro-magnetic field?

6. Translate Eq. (1) to the quantum case with creation and annihilation operators.

7. What is the interpretation of phi in Eq. (4)

8. Lock-up a diagram of the energy levels of sodium, incl. the relevant optical transitions and wavelength

9. Explain the role of the optical pre-pumping beam

10. What is Einstein coefficient A? What does this mean in MHz?

11. Why are two photomultipliers involved?

12. How is assured that only one or two atoms contribute to the collected signal?

13. What is the measured evidence for non-classical light?

14. Estimate the total measurement time for Fig. 2 from bin-size and count rates $\Re_1$ and $\Re_2$.

15. Sketch how Fig. 3 would look for beta=0; beta >> Omega. Eq. (5) might help.

16. What is the role of non-locality in the experiment. Is there any entanglement/spooky action at a distance?