10.2. *Observation of collective excitation of two individual atoms in the Rydberg blockade regime,* Alpha Gaëtan, et al., NATURE PHYSICS 5, 115 (2009)

Presenter (10 min !):
Sketch the key results on the blackboard. Limit to 1 Eq. + 2 graphs)!
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. How do Rydberg atoms interact? What is the Rydberg blockade?

2. Why is the Rydberg blockade so interesting?

3. Which potential applications are discussed? Which of them have been realized?

4. Benchmark neutral atoms along the DiVincenzo criteria

5. How do optical tweezers work?

6. Proof that Psi- is decoupled from the ground state, while Psi+ couples with $\sqrt{2}\,\Omega$

7. How is the excitation to the Rydberg states realized?

8. Can you observe Rydberg blockade for arbitrary strong/fast excitation pulses?

9. What happens when two atoms are simultaneously excited to a Rydberg state?

10. What determines if the blockade is effective or not?

11. What limits the T2* time observed in Fig. 3?

12. How can the Rydberg blockade be used to build CNOT gates?

13. Take a look at three follow up experiments using the Rydberg blockade. Some suggestions: Nature Physics 16, 857 (2020); Science 365, 775 (2019); *Nature* **551**, 579 (2017); Science 347, 1458 (2015); Nature 491, 87 (2012); PRL 104, 010503 (2010); https://www.atom-computing.com;