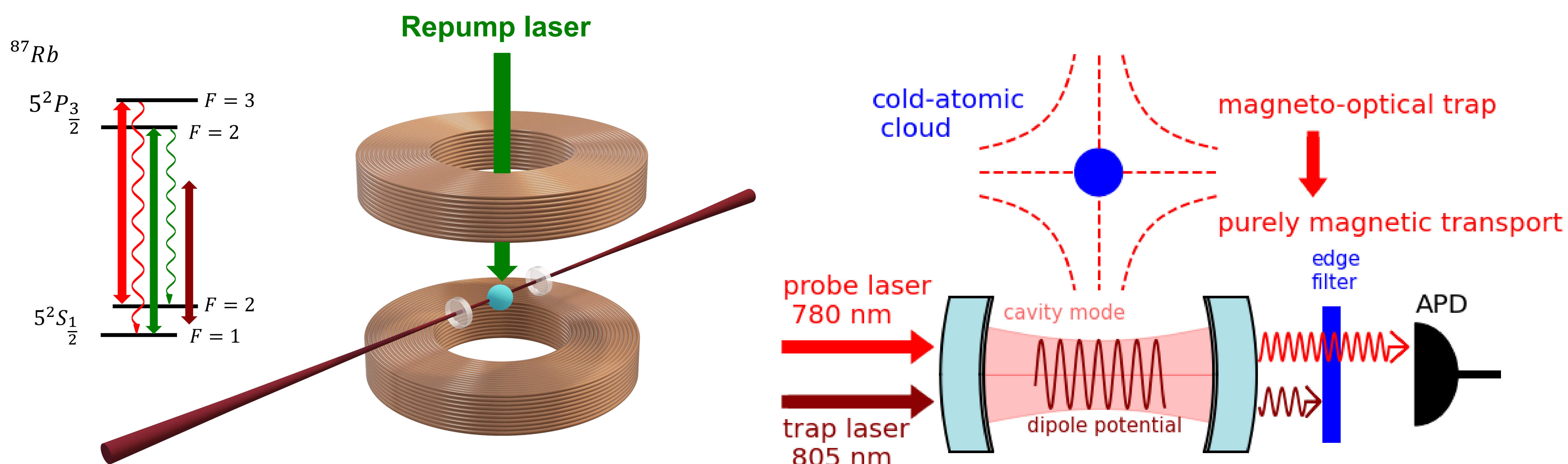
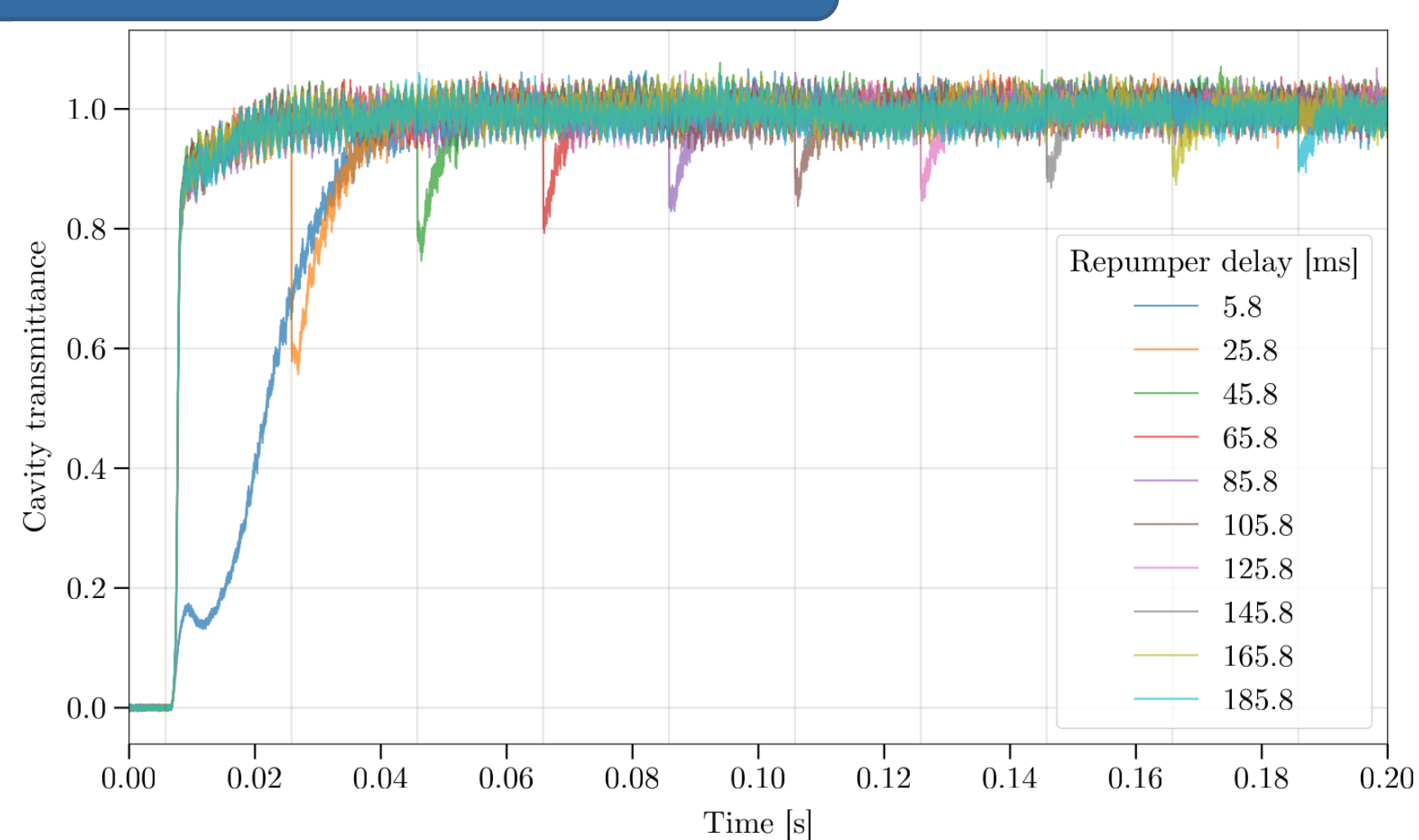


Toward atom-based quantum technology

- Objective: strong coupling atom-photon interface.
- Realization: loading cold atoms from a movable magnetic quadrupole trap into an optical dipole trap sustained by a single mode of a high-finesse optical resonator.



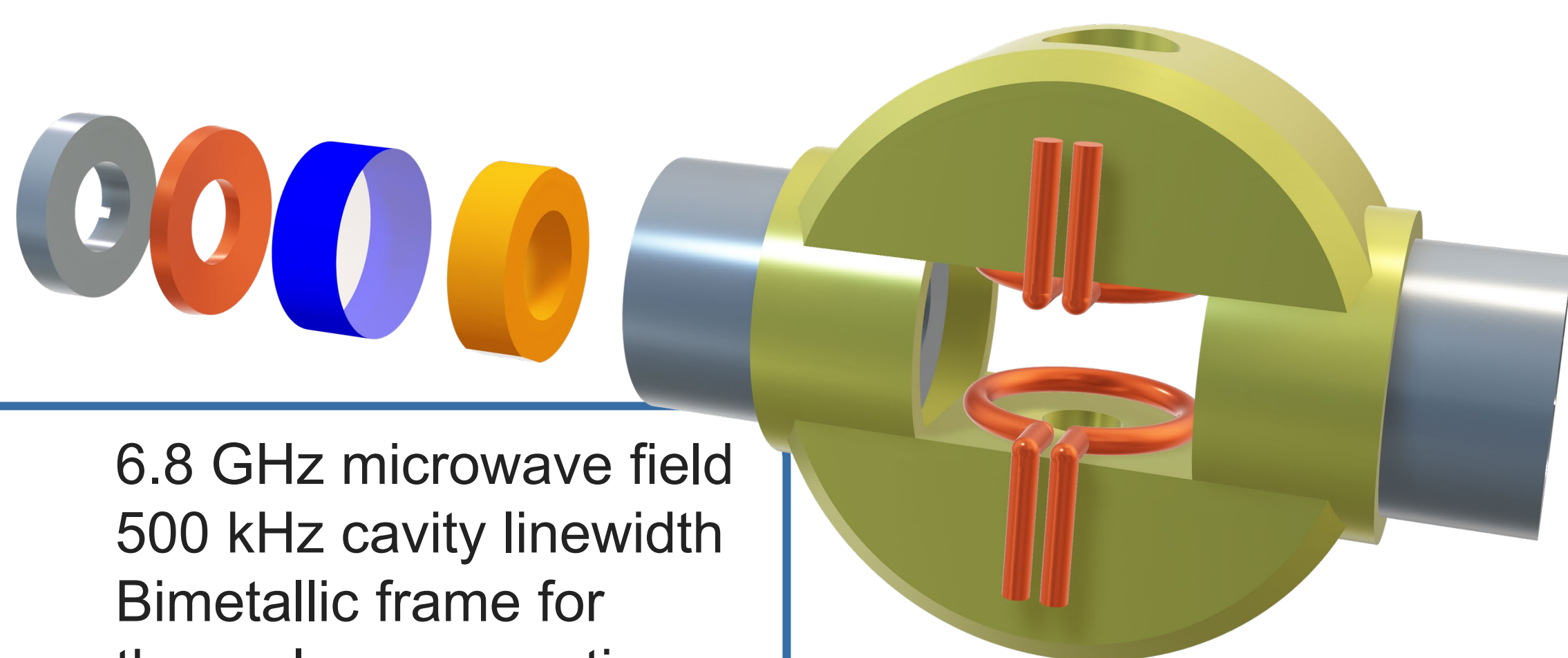
Photodetection



- Transport
- Loading to optical dipole trap
- Switch on probe light at $t = 0$
- Switch on the repumper, $t = t + \Delta t$
- Record the probe light transmission
- The cavity probe field optically pumps the atoms into the $F=1$ state in which they are captured by the optical dipole trap for long times.

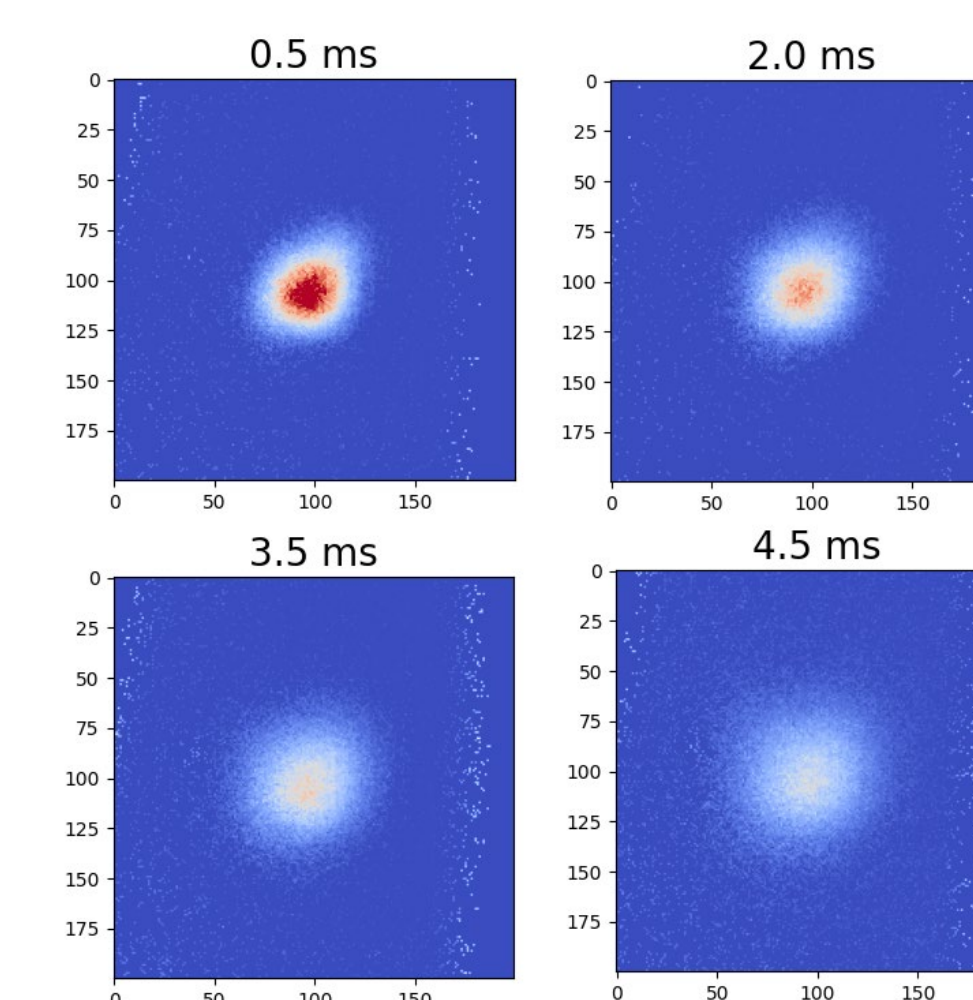
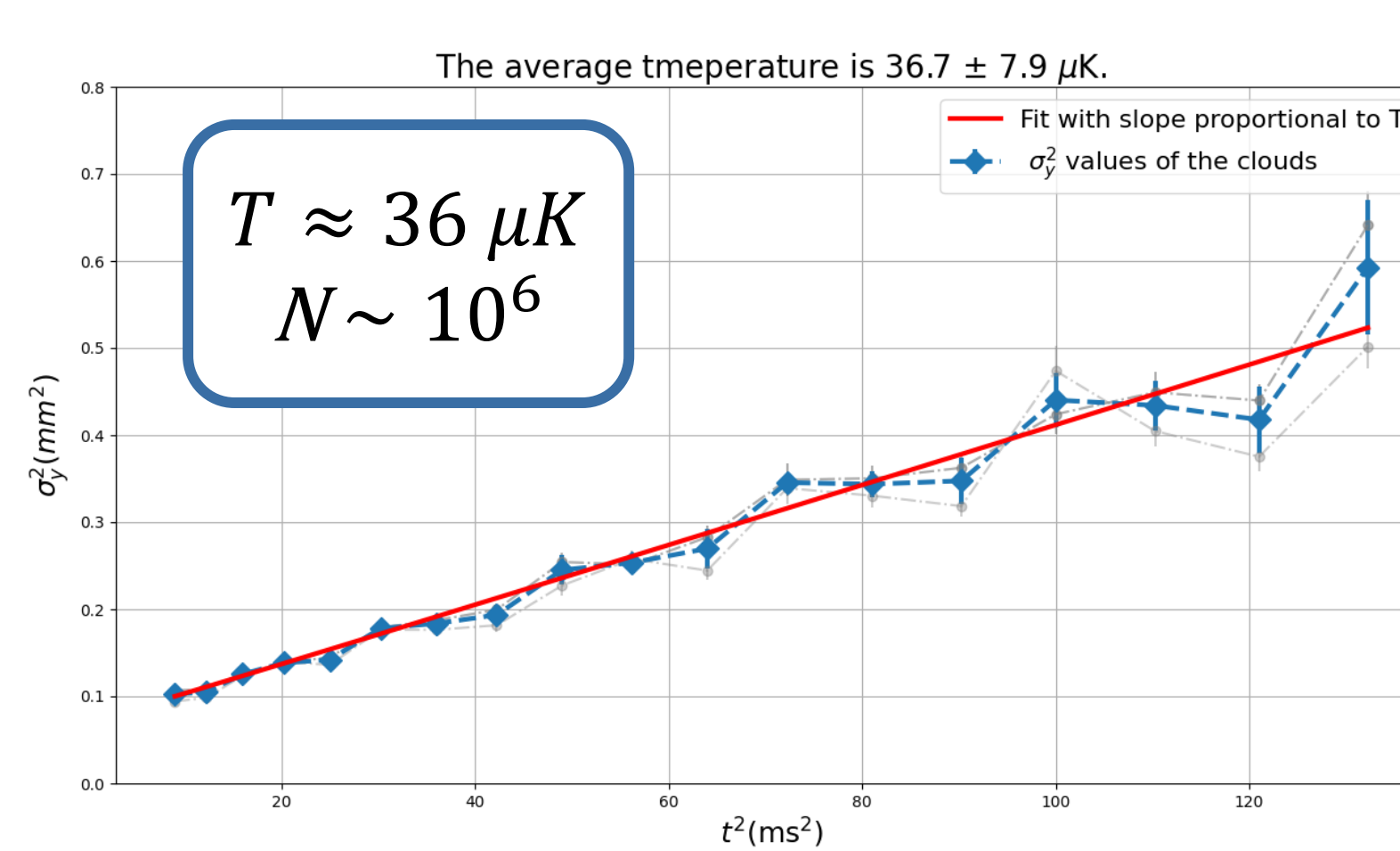
Outlook

Microwave to optical conversion with atoms in a cavity

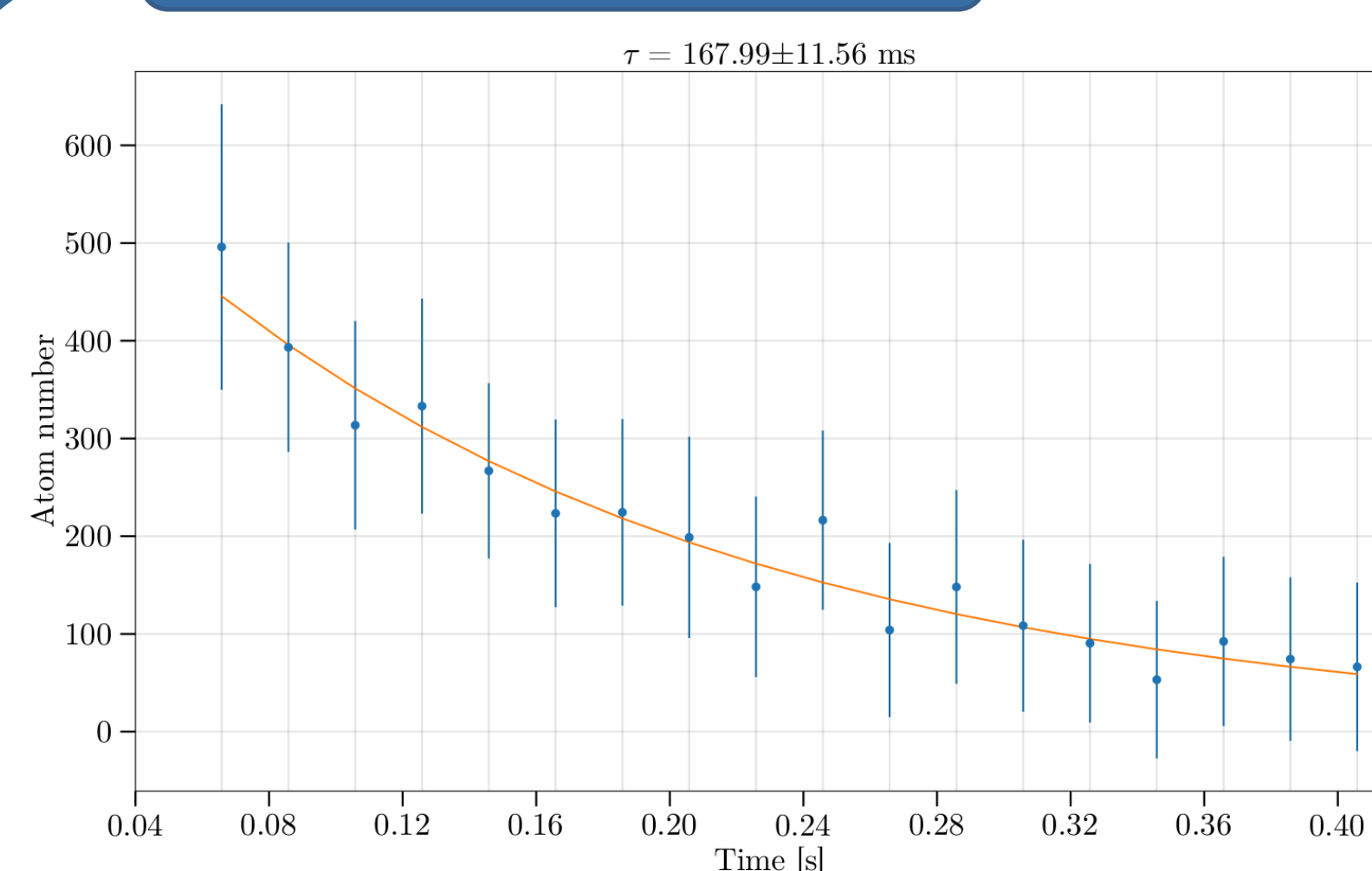


- 6.8 GHz microwave field
- 500 kHz cavity linewidth
- Bimetallic frame for thermal compensation

Cold atoms



Trapping time



Atoms are still present after 200 ms

Stronger dipole trap laser increases the trapping time
↓
temperature limited regime

