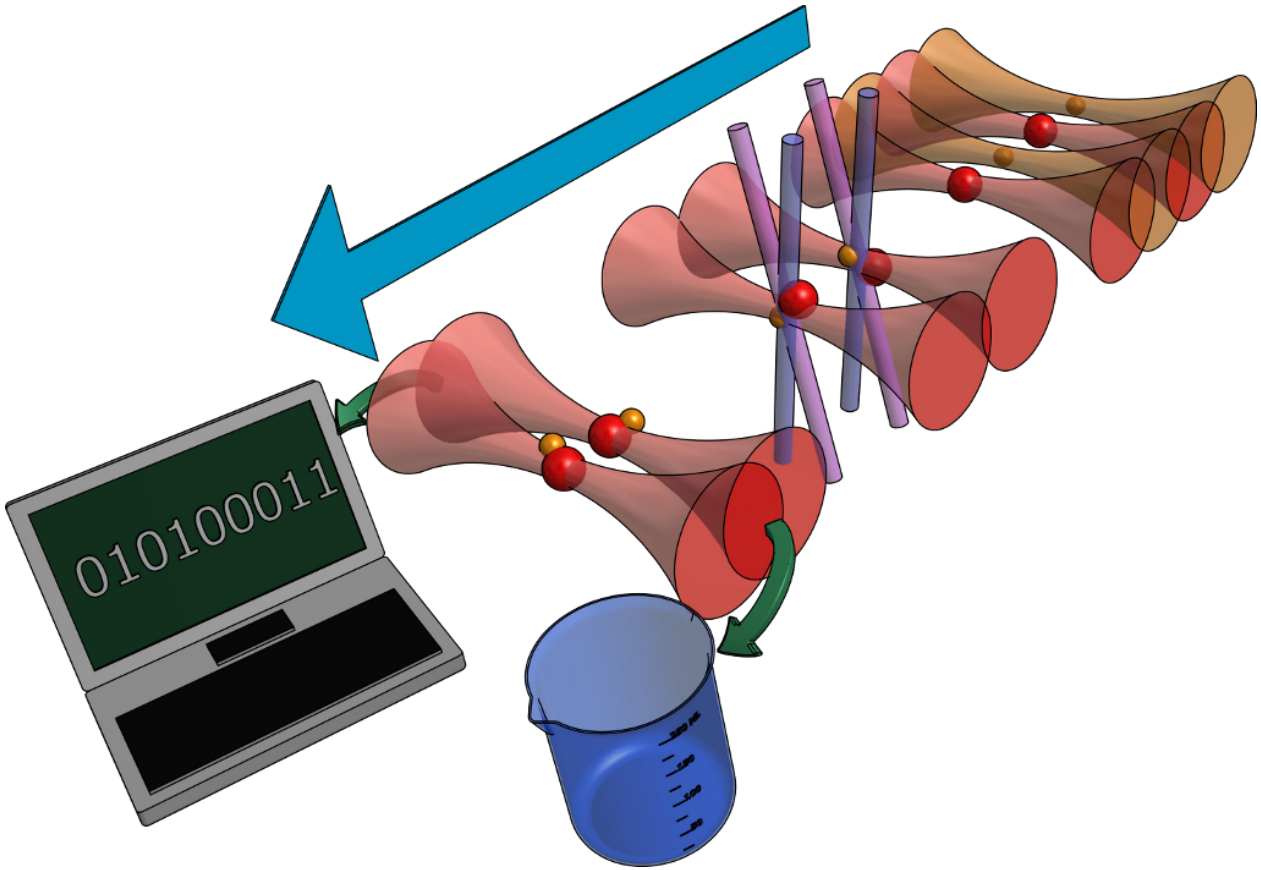
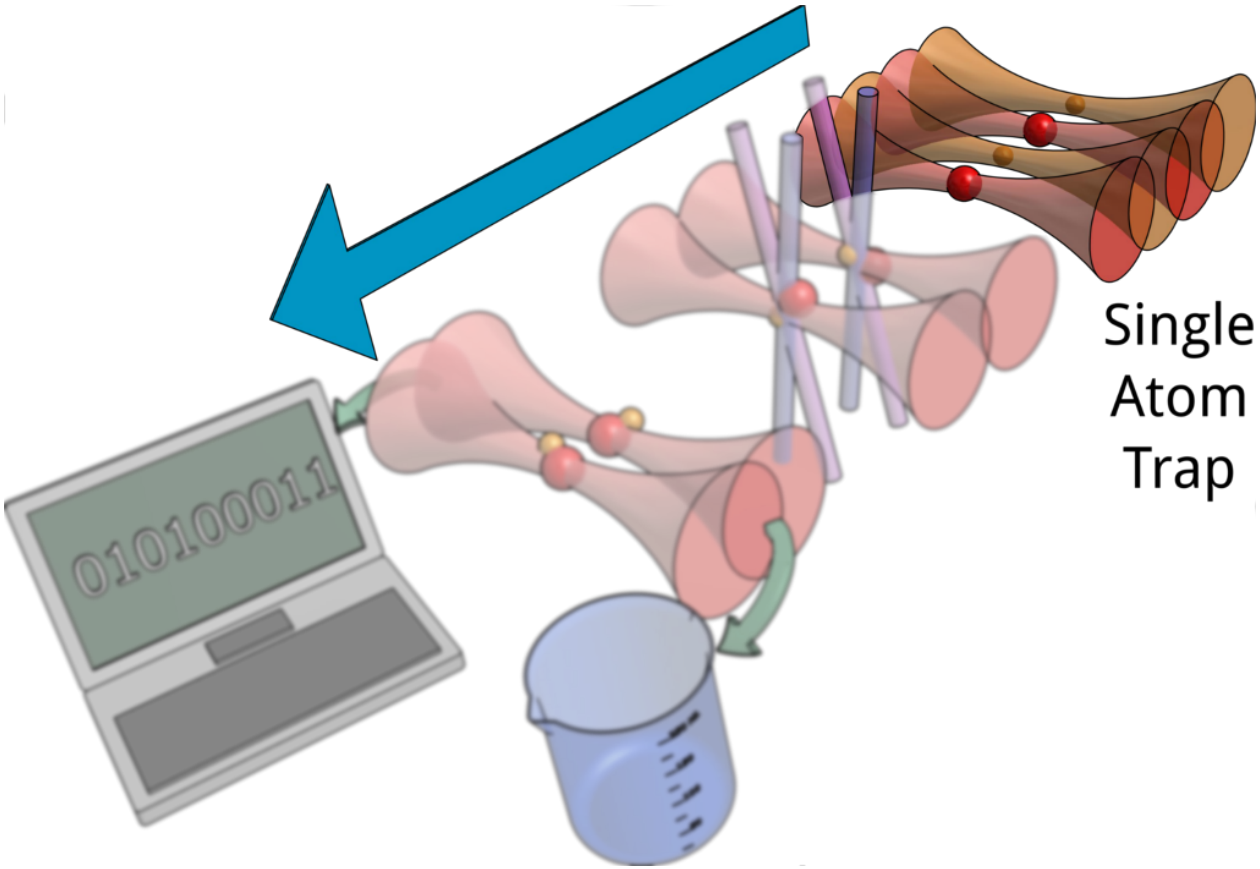
Apparatus for making dipolar NaCs molecules



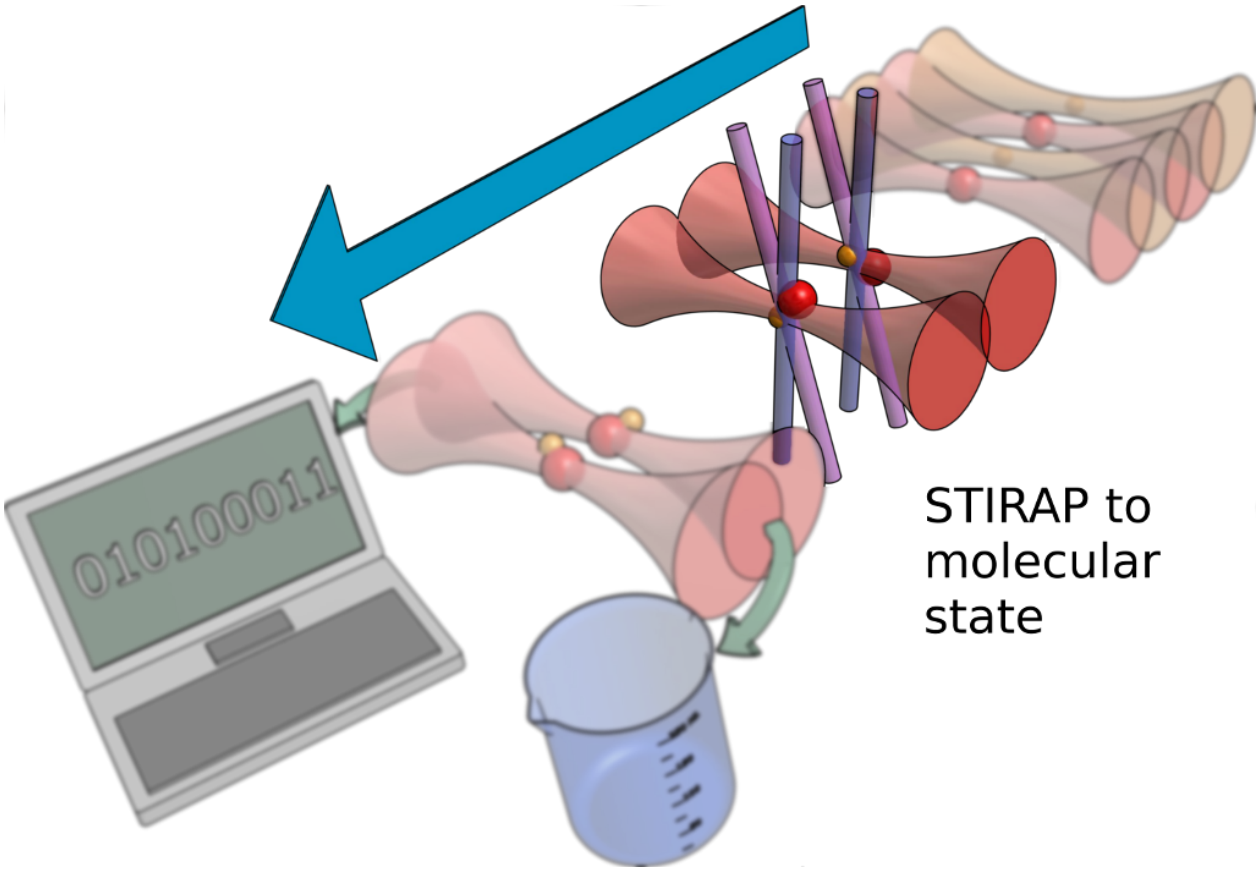
Yichao Yu
May 3, 2015
Harvard/Ni Group

Apparatus for making dipolar NaCs molecules



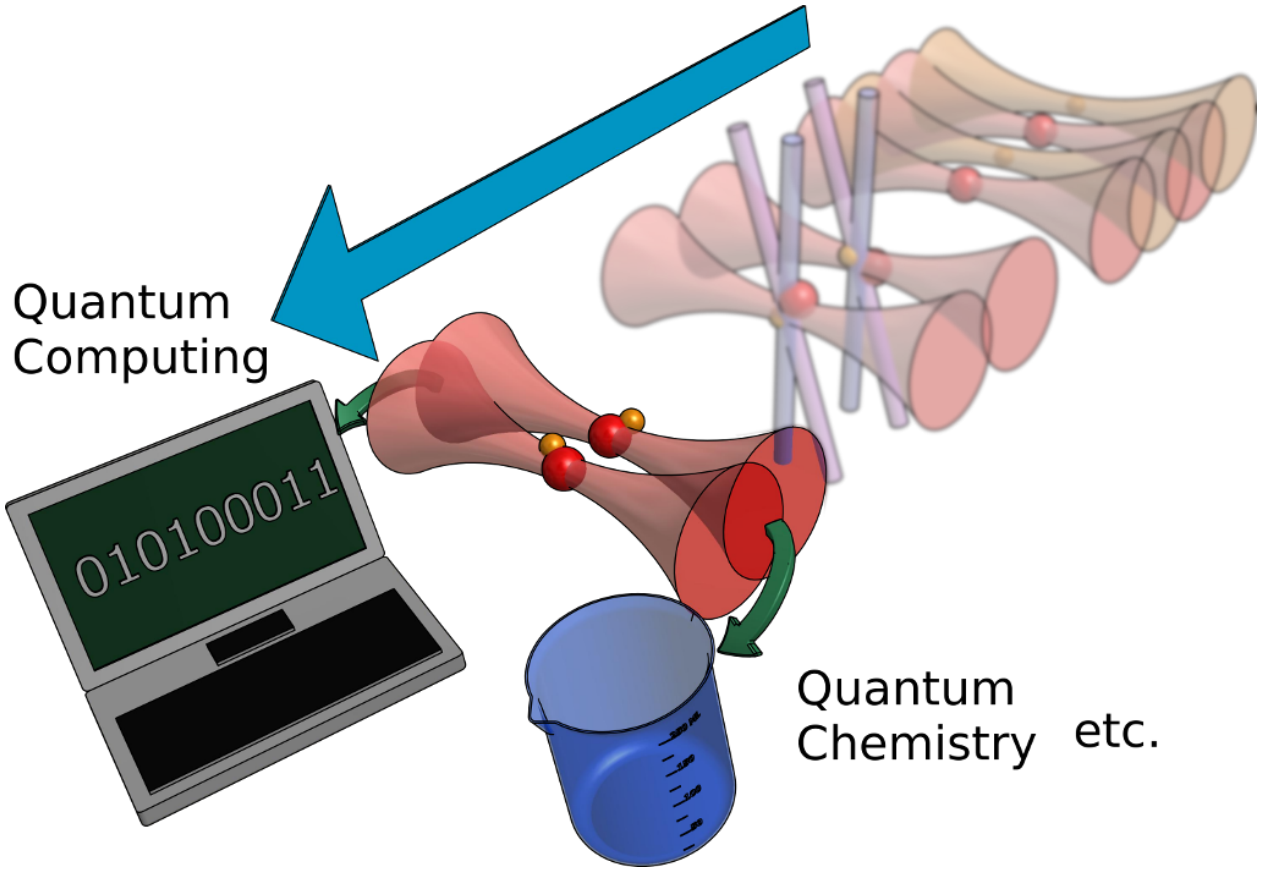
Yichao Yu
May 3, 2015
Harvard/Ni Group

Apparatus for making dipolar NaCs molecules



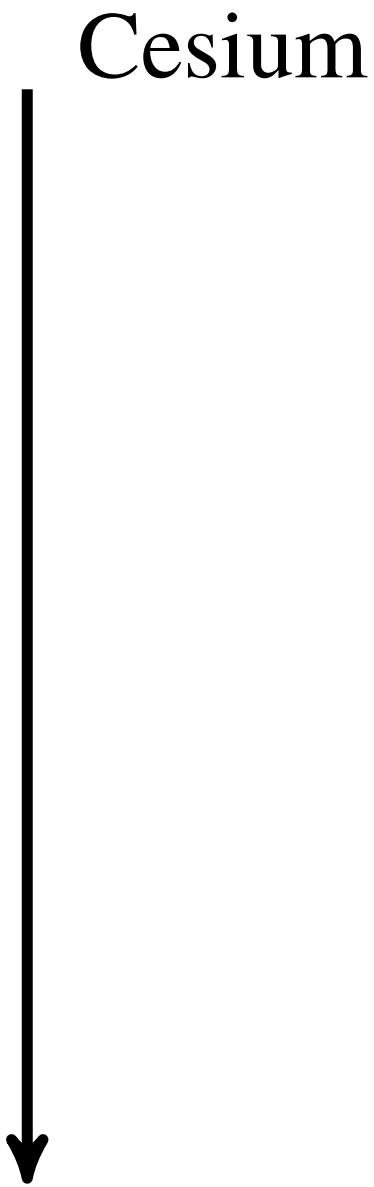
Yichao Yu
May 3, 2015
Harvard/Ni Group

Apparatus for making dipolar NaCs molecules



Yichao Yu
May 3, 2015
Harvard/Ni Group

Current state



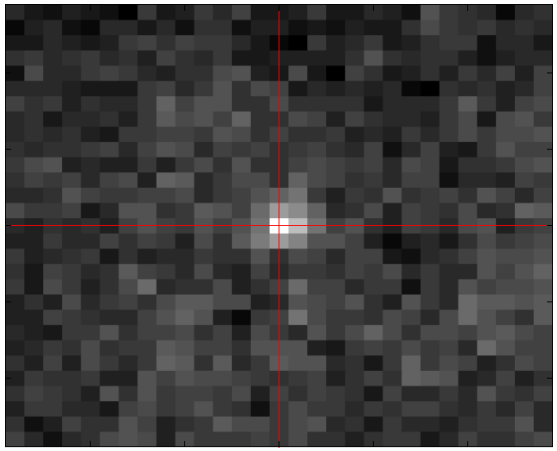
Current state

Current state

Cesium

MOT

Trapping single atom

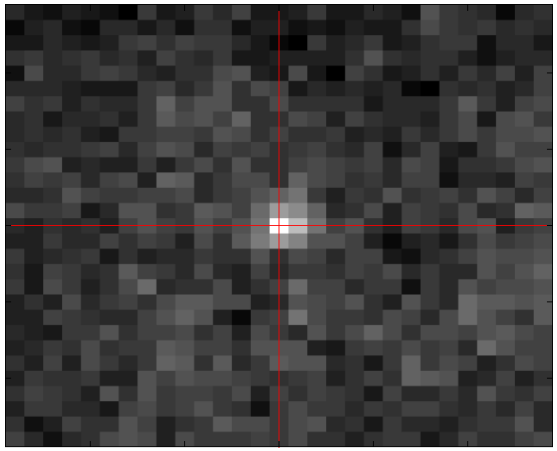


Current state

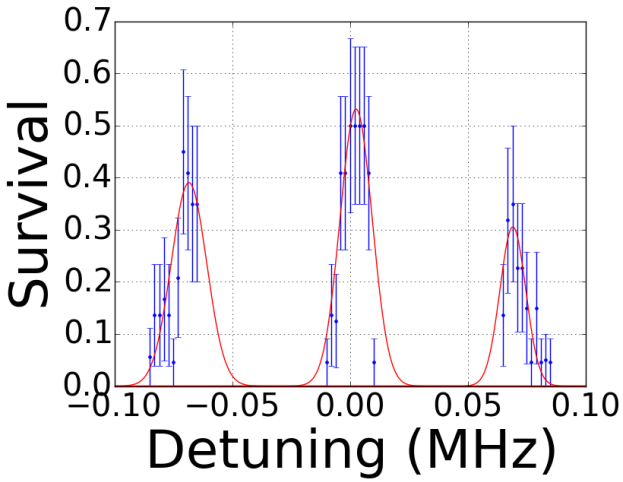
Cesium

MOT

Trapping single atom



Single atom cooling

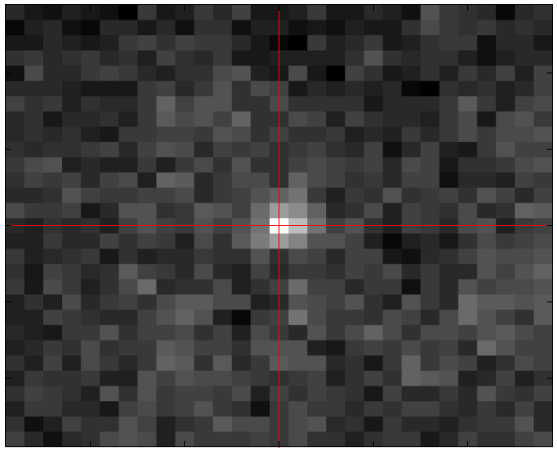


Current state

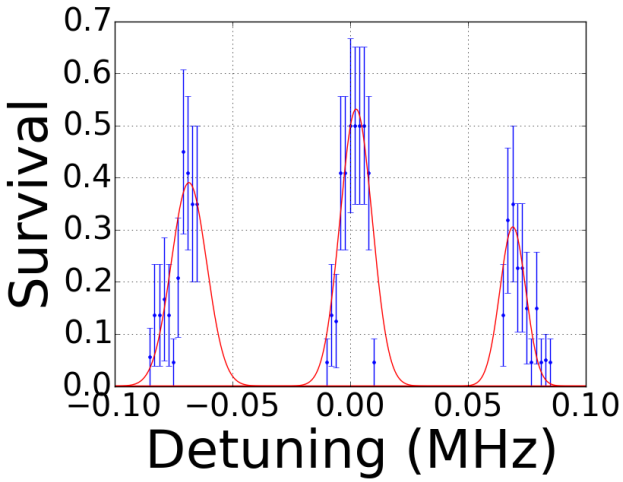
Cesium

MOT

Trapping single atom



Single atom cooling

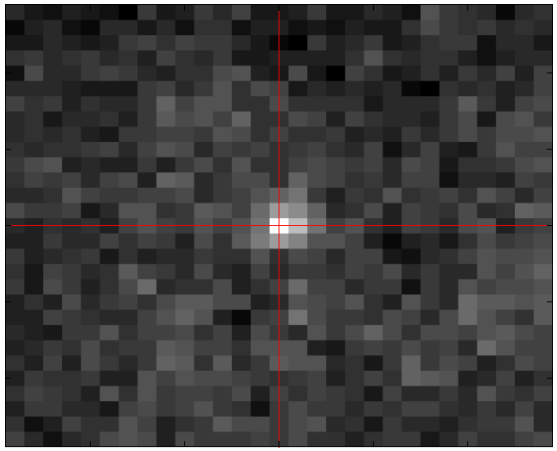


Sodium

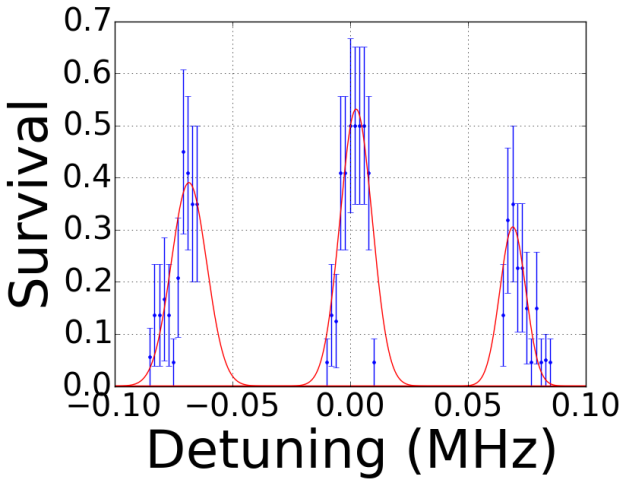
Current state

Cesium

MOT



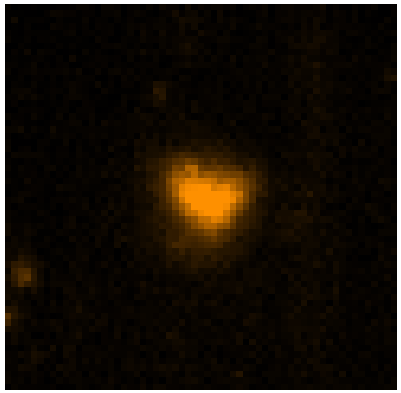
Trapping single atom



Single atom cooling

Sodium

MOT

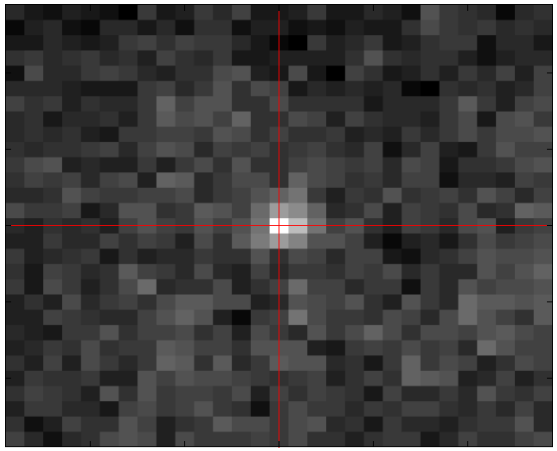


Current state

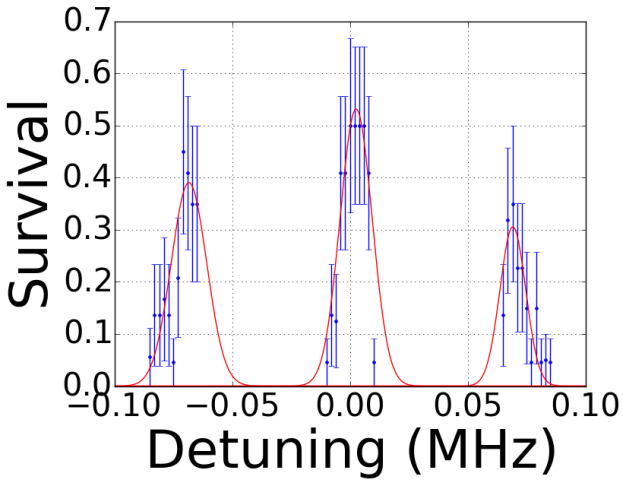
Cesium

MOT

Trapping single atom

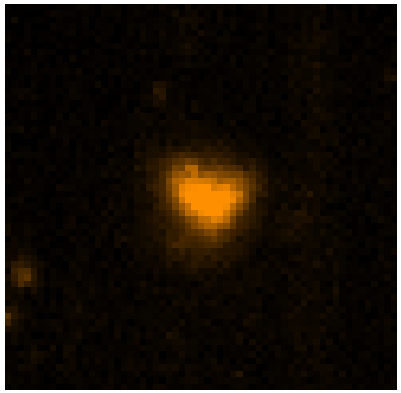


Single atom cooling



Sodium

MOT

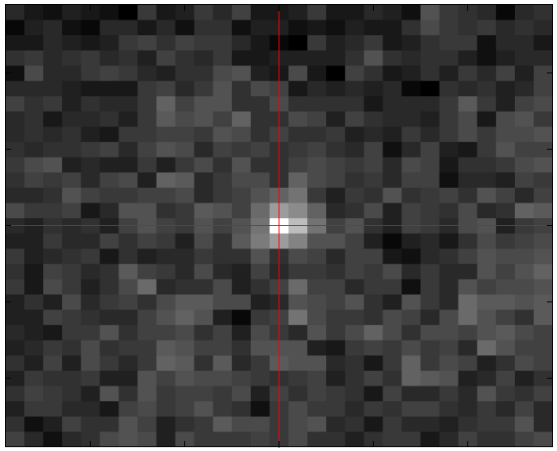


Looking for single atom

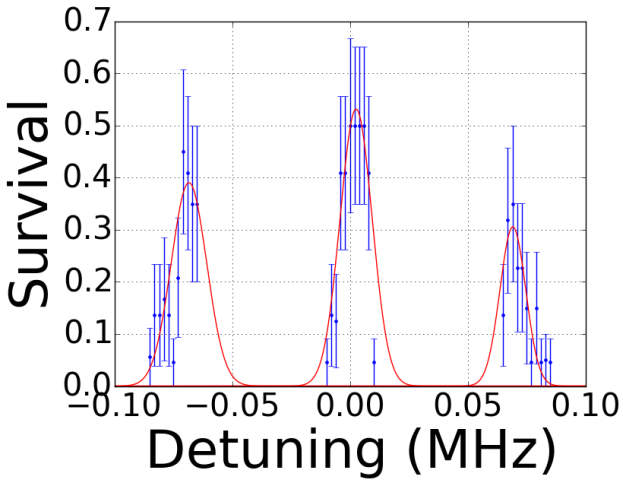
Current state

Cesium

MOT



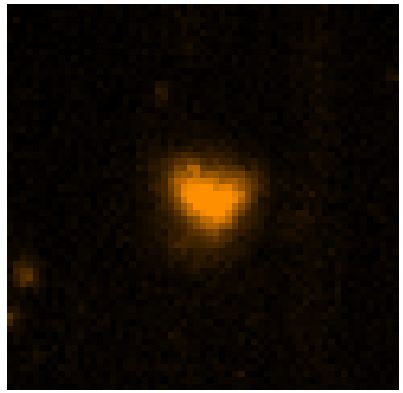
Trapping single atom



Single atom cooling

Sodium

MOT



Looking for single atom

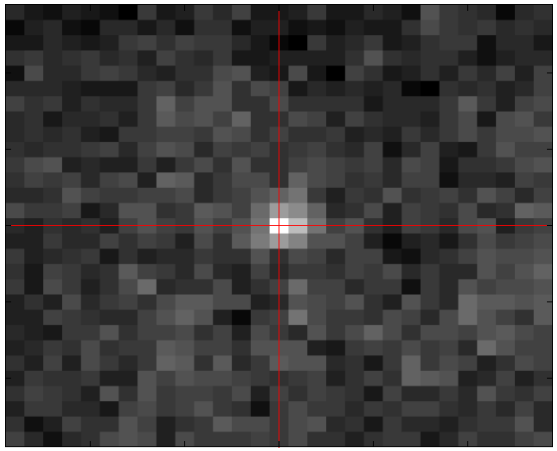
Problems

- Sodium laser
- MOT stability

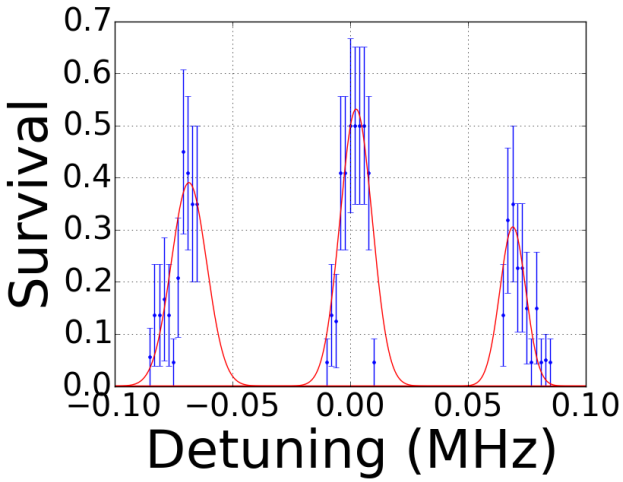
Current state

Cesium

MOT



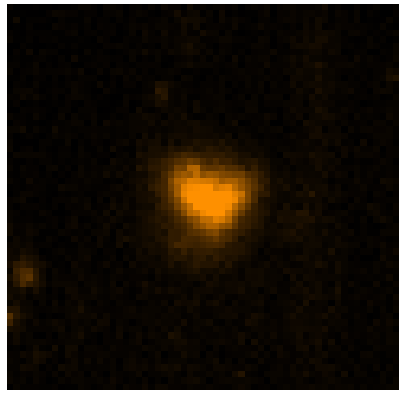
Trapping single atom



Single atom cooling

Sodium

MOT



Looking for single atom

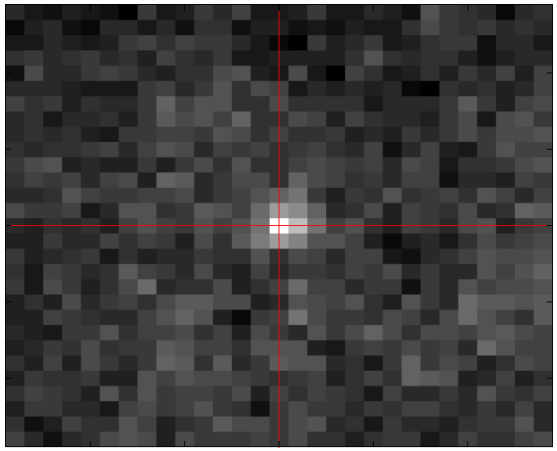
Problems

- Sodium laser
- MOT stability

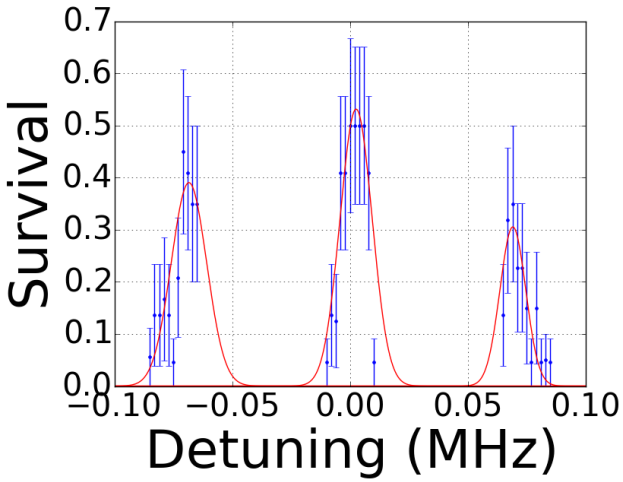
Current state

Cesium

MOT



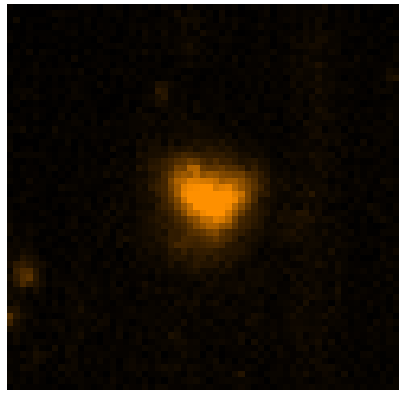
Trapping single atom



Single atom cooling

Sodium

MOT



Looking for single atom

Problems

- Sodium laser
- MOT stability

Laser system for Sodium

Sodium wavelengths

- D lines $\approx$ 589nm
- D2 line (Cooling, Imaging)
- D1 line (Pumping, Cooling)
- Off resonance (Raman transition)

Laser system for Sodium

Sodium wavelengths

- D lines $\approx$ 589nm
- D2 line (Cooling, Imaging)
- D1 line (Pumping, Cooling)
- Off resonance (Raman transition)

Laser system for Sodium

Sodium wavelengths

- D lines $\approx$ 589nm
- D2 line (Cooling, Imaging)
- D1 line (Pumping, Cooling)
- Off resonance (Raman transition)

Laser system for Sodium

Sodium wavelengths

- D lines $\approx$ 589nm
- D2 line (Cooling, Imaging)
- D1 line (Pumping, Cooling)
- Off resonance (Raman transition)

Laser system for Sodium

Sodium wavelengths

- D lines $\approx$ 589nm
- D2 line (Cooling, Imaging)
- D1 line (Pumping, Cooling)
- Off resonance (Raman transition)

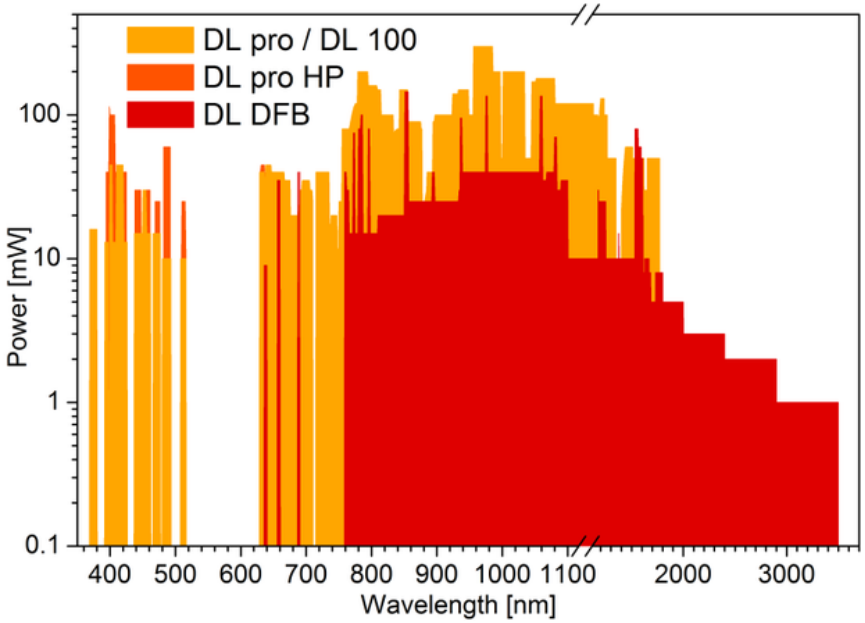
Using diode laser

- Diode laser spectrum
- Power requirement for frequency doubling
- Diode laser from Innolume / TimeBase
- Waveguide doubler

Laser system for Sodium

Sodium wavelengths

- D lines $\approx$ 589nm
- D2 line (Cooling, Imaging)
- D1 line (Pumping, Cooling)
- Off resonance (Raman transition)



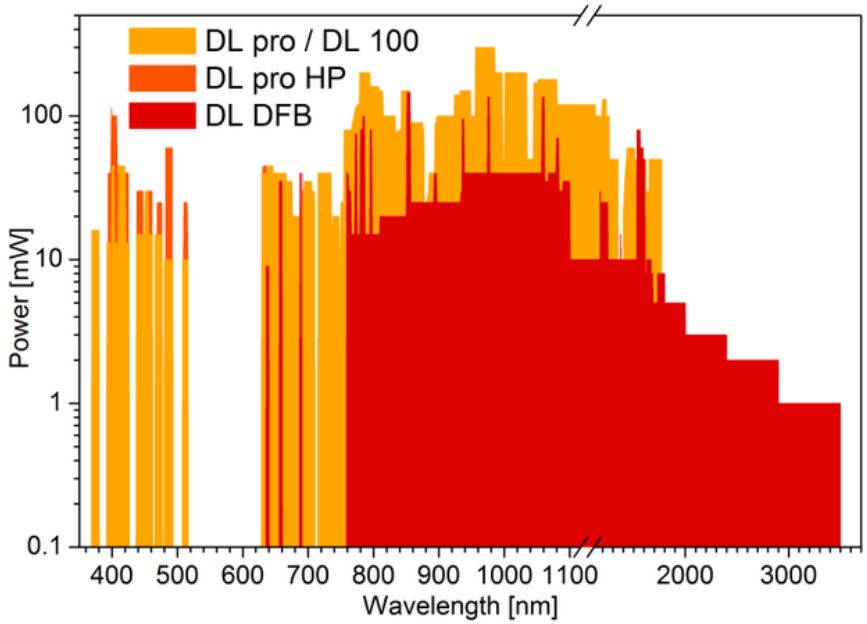
Using diode laser

- Diode laser spectrum
- Power requirement for frequency doubling
- Diode laser from Innolume / TimeBase
- Waveguide doubler

Laser system for Sodium

Sodium wavelengths

- D lines $\approx$ 589nm
- D2 line (Cooling, Imaging)
- D1 line (Pumping, Cooling)
- Off resonance (Raman transition)



Using doubled diode laser

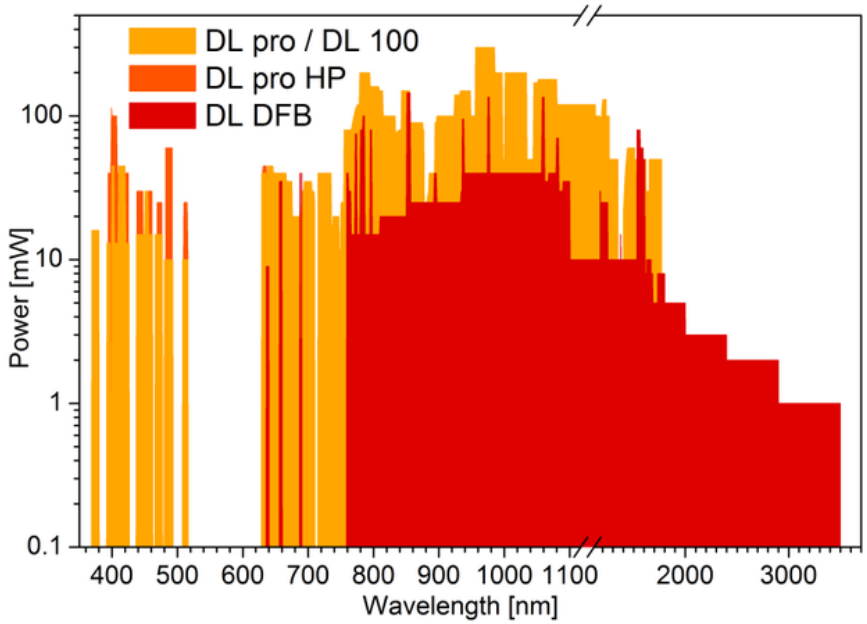
$589 \times 2 = 1178$**nm**

- Diode laser spectrum
- Power requirement for frequency doubling
- Diode laser from Innolume / TimeBase
- Waveguide doubler

Laser system for Sodium

Sodium wavelengths

- D lines $\approx$ 589nm
- D2 line (Cooling, Imaging)
- D1 line (Pumping, Cooling)
- Off resonance (Raman transition)



Using doubled diode laser

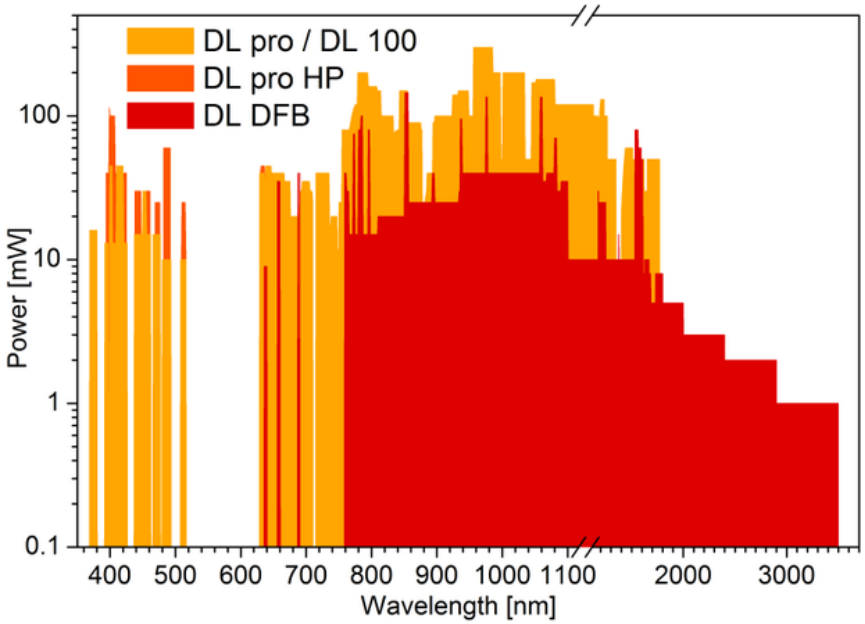
$589 \times 2 = 1178$**nm**

- Diode laser spectrum
- Power requirement for frequency doubling
- Diode laser from Innolume / TimeBase
- Waveguide doubler

Laser system for Sodium

Sodium wavelengths

- D lines $\approx$ 589nm
- D2 line (Cooling, Imaging)
- D1 line (Pumping, Cooling)
- Off resonance (Raman transition)



Using doubled diode laser

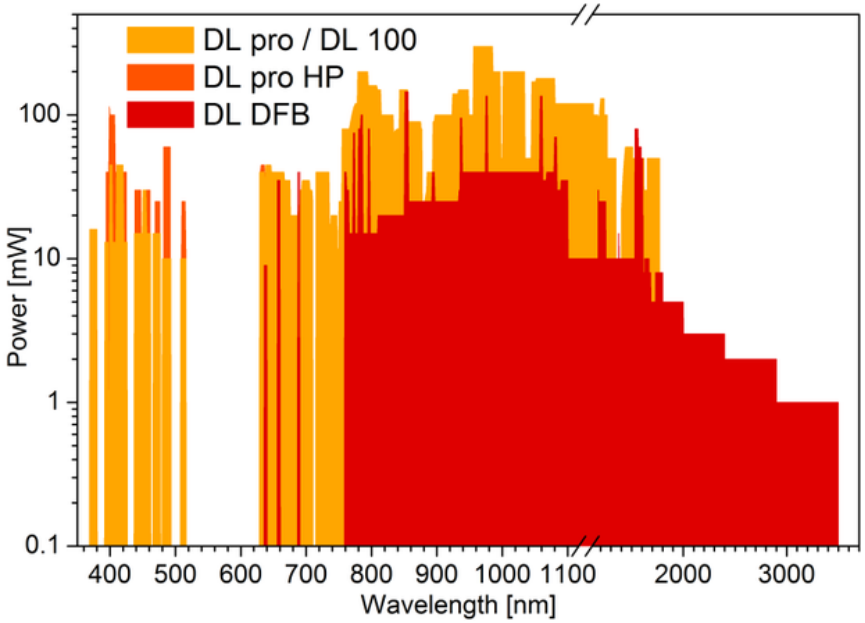
$589 \times 2 = 1178$**nm**

- Diode laser spectrum
- Power requirement for frequency doubling
- Diode laser from Innolume / TimeBase
- Waveguide doubler

Laser system for Sodium

Sodium wavelengths

- D lines $\approx$ 589nm
- D2 line (Cooling, Imaging)
- D1 line (Pumping, Cooling)
- Off resonance (Raman transition)



Using doubled diode laser

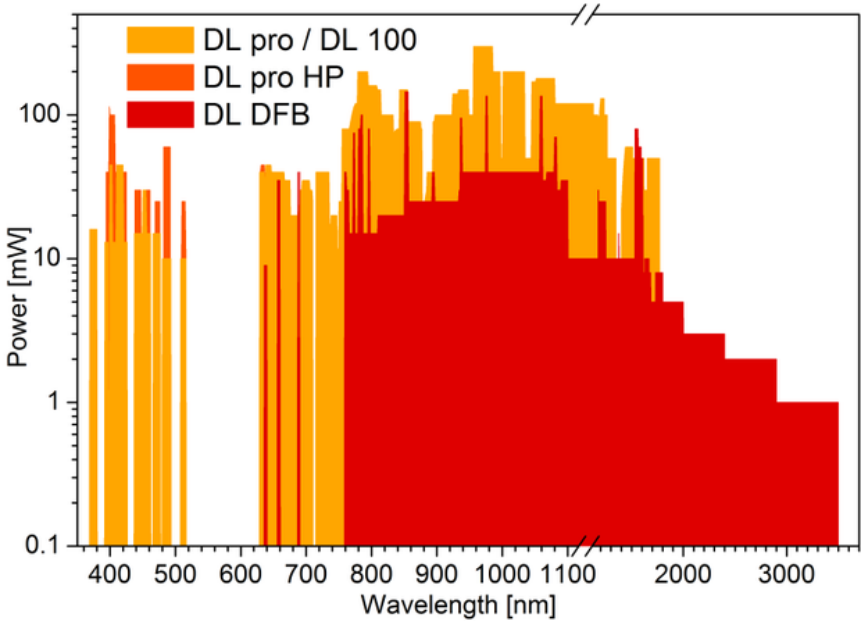
$589 \times 2 = 1178$**nm**

- Diode laser spectrum
- Power requirement for frequency doubling
- Diode laser from Innolume / TimeBase
  Tunable from ...nm to ...nm
- Waveguide doubler

Laser system for Sodium

Sodium wavelengths

- D lines $\approx$ 589nm
- D2 line (Cooling, Imaging)
- D1 line (Pumping, Cooling)
- Off resonance (Raman transition)



Using doubled diode laser

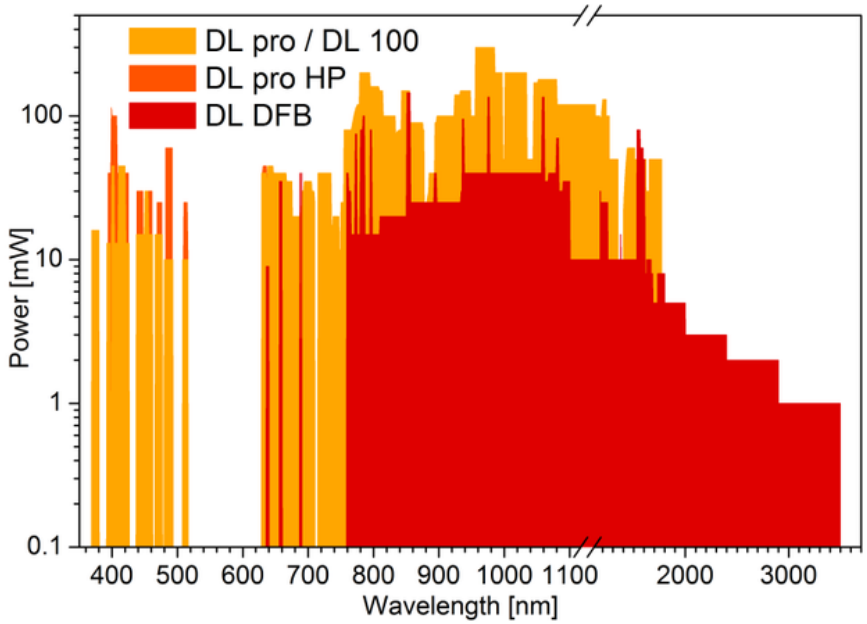
$589 \times 2 = 1178$**nm**

- Diode laser spectrum
- Power requirement for frequency doubling
- Diode laser from Innolume / TimeBase
  Tunable from ...nm to ...nm
- Waveguide doubler

Laser system for Sodium

Sodium wavelengths

- D lines $\approx$ 589nm
- D2 line (Cooling, Imaging)
- D1 line (Pumping, Cooling)
- Off resonance (Raman transition)



Using doubled diode laser

$589 \times 2 = 1178$**nm**

- Diode laser spectrum
- Power requirement for frequency doubling
- Diode laser from Innolume / TimeBase
  Tunable from …nm to …nm
- Waveguide doubler

MOT stability

- Interference and stability issue with a small MOT
- Modulating the MOT beams

MOT stability

- Interference and stability issue with a small MOT
- Modulating the MOT beams

Members