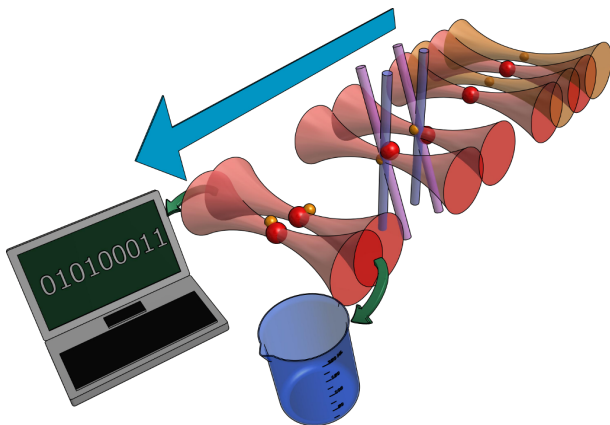
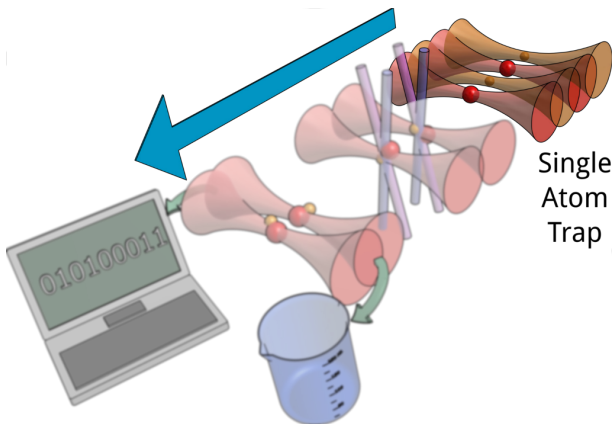


Apparatus for making dipolar NaCs molecules



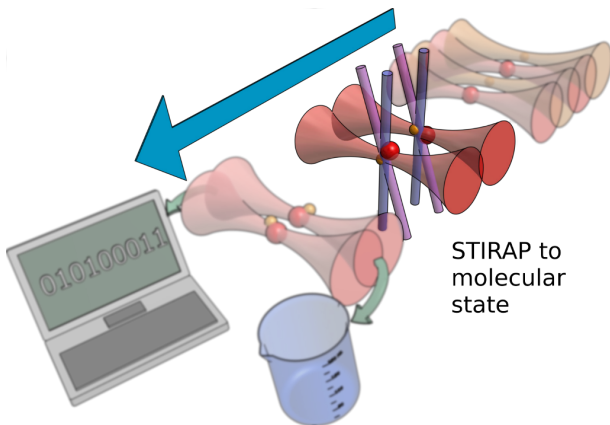
Yichao Yu
May 3, 2015
Harvard/Ni Group

Apparatus for making dipolar NaCs molecules



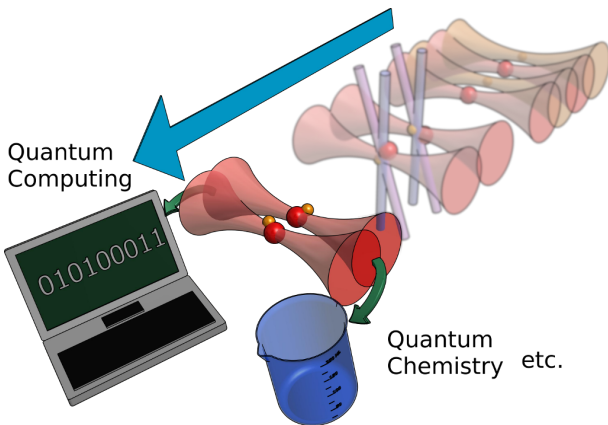
Yichao Yu
May 3, 2015
Harvard/Ni Group

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

- Trapping Cs single atom
- Cs single atom cooling
- Na MOT
- Looking for trapped single Na atom

Current state

- Trapping Cs single atom
- Cs single atom cooling
- Na MOT
- Looking for trapped single Na atom

Current state

- Trapping Cs single atom
- Cs single atom cooling
- Na MOT
- Looking for trapped single Na atom

Current state

- Trapping Cs single atom
- Cs single atom cooling
- Na MOT
- Looking for trapped single Na atom

Current state

- Trapping Cs single atom
- Cs single atom cooling
- Na MOT
- Looking for trapped single Na atom

Problems

- Sodium laser
- MOT stability

Current state

- Trapping Cs single atom
- Cs single atom cooling
- Na MOT
- Looking for trapped single Na atom

Problems

- Sodium laser
- MOT stability

Current state

- Trapping Cs single atom
- Cs single atom cooling
- Na MOT
- Looking for trapped single Na atom

Problems

- Sodium laser
- MOT stability

Laser system for Sodium

Sodium wavelengths

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

Laser system for Sodium

Sodium wavelengths

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

Laser system for Sodium

Sodium wavelengths

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

Laser system for Sodium

Sodium wavelengths

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

Laser system for Sodium

Sodium wavelengths

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

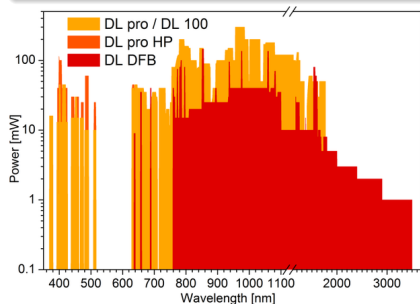
Using diode laser

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

Laser system for Sodium

Sodium wavelengths

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



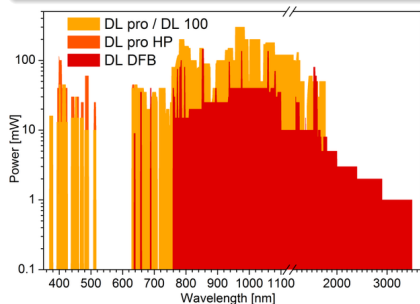
Using diode laser

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

Laser system for Sodium

Sodium wavelengths

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



Using doubled diode laser

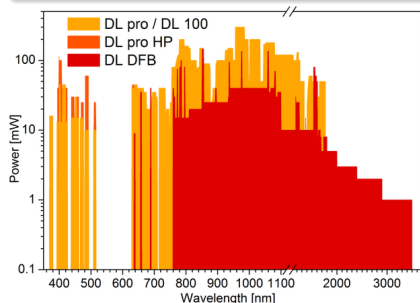
$$589 \times 2 = 1178\text{nm}$$

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

Laser system for Sodium

Sodium wavelengths

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



Using doubled diode laser

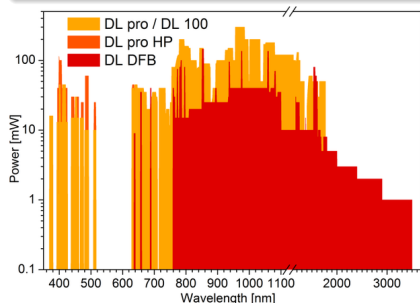
$$589 \times 2 = 1178\text{nm}$$

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

Laser system for Sodium

Sodium wavelengths

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



Using doubled diode laser

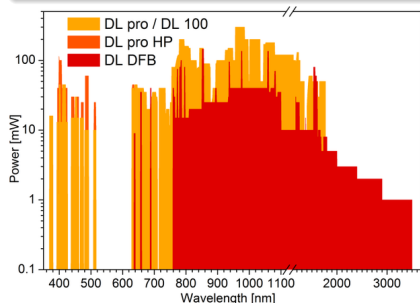
$$589 \times 2 = 1178\text{nm}$$

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

Laser system for Sodium

Sodium wavelengths

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



Using doubled diode laser

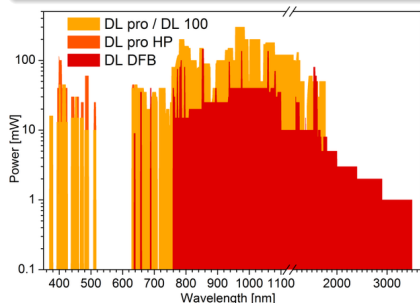
$$589 \times 2 = 1178\text{nm}$$

- 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 $\approx 589\text{nm}$
- D2 line (Cooling, Imaging)
- D1 line (Pumping, Cooling)
- Off resonance (Raman transition)



Using doubled diode laser

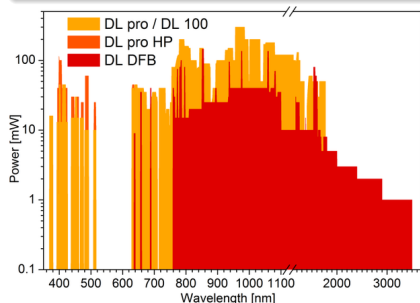
$$589 \times 2 = 1178\text{nm}$$

- 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 $\approx 589\text{nm}$
- D2 line (Cooling, Imaging)
- D1 line (Pumping, Cooling)
- Off resonance (Raman transition)



Using doubled diode laser

$$589 \times 2 = 1178\text{nm}$$

- 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