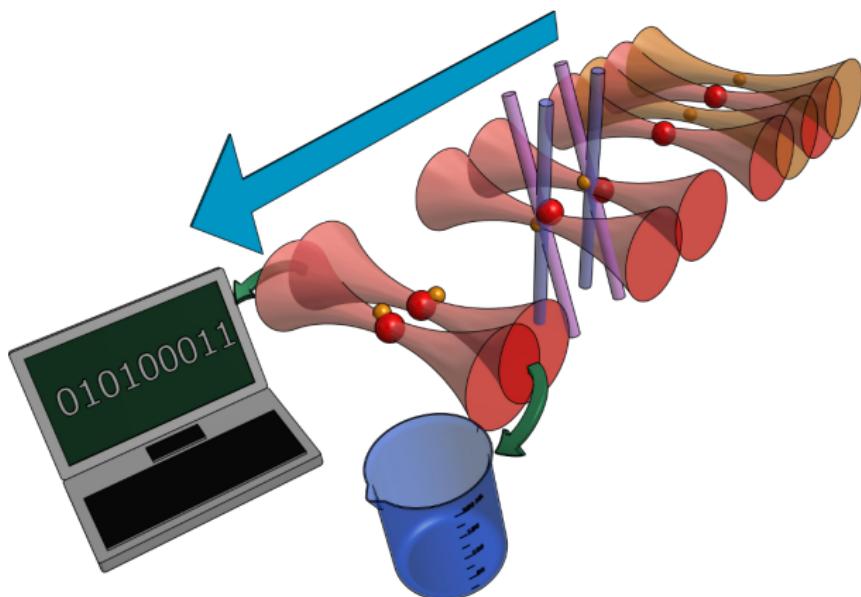
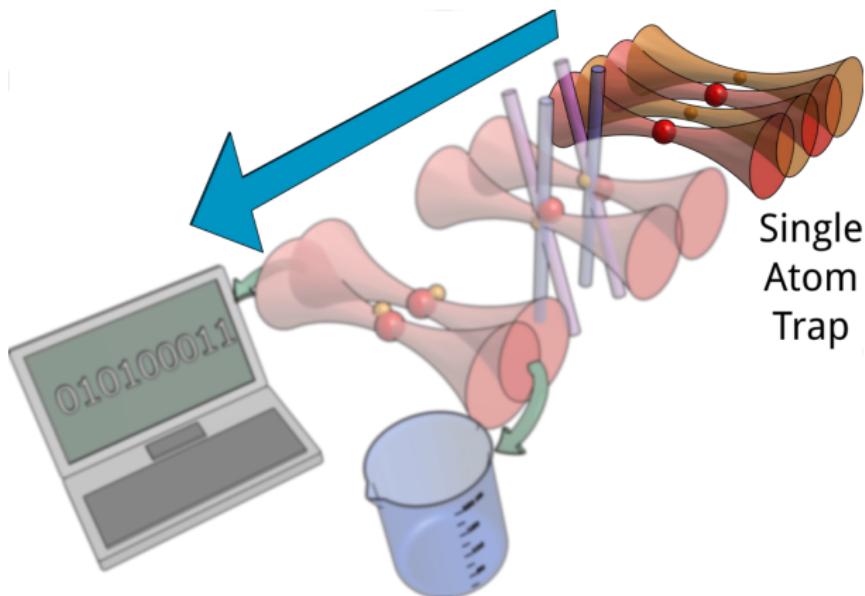


# Apparatus for making dipolar NaCs molecules



Yichao Yu  
May 4, 2015  
Harvard/Ni Group

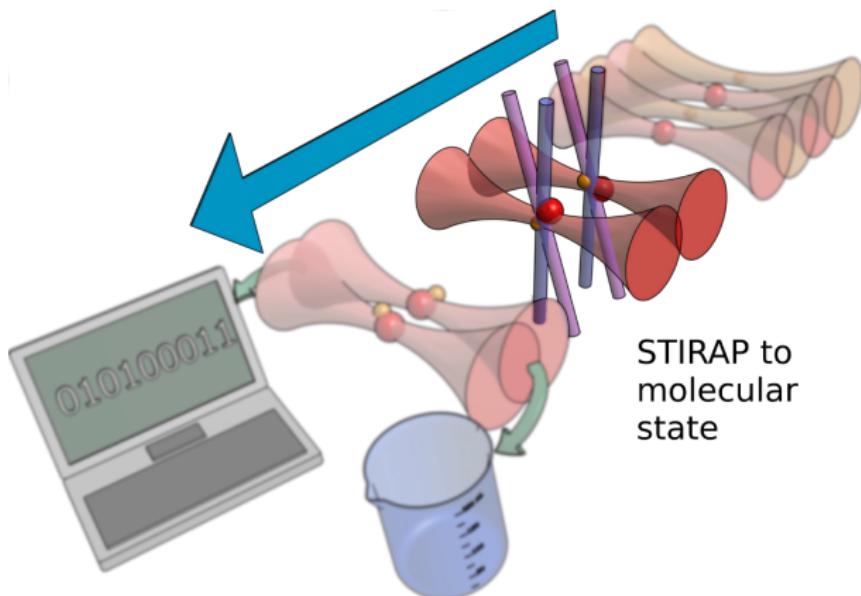
# Apparatus for making dipolar NaCs molecules



Single  
Atom  
Trap

Yichao Yu  
May 4, 2015  
Harvard/Ni Group

# Apparatus for making dipolar NaCs molecules

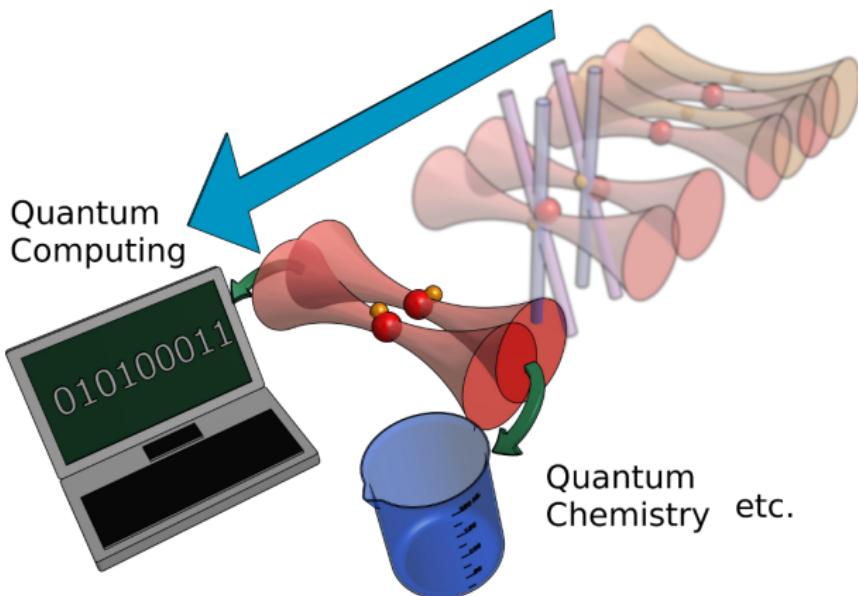


Yichao Yu

May 4, 2015

Harvard/Ni Group

# Apparatus for making dipolar NaCs molecules



Yichao Yu

May 4, 2015

Harvard/Ni Group

Current state: Atom cooling

# Cesium



## Current state: Atom cooling

Cesium

MOT

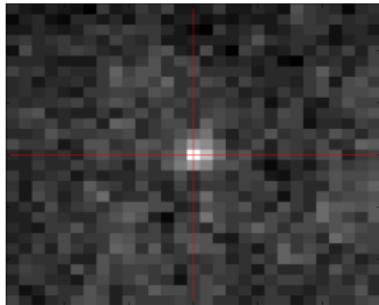


## Current state: Atom cooling

Cesium

MOT

Trapping  
single  
atom



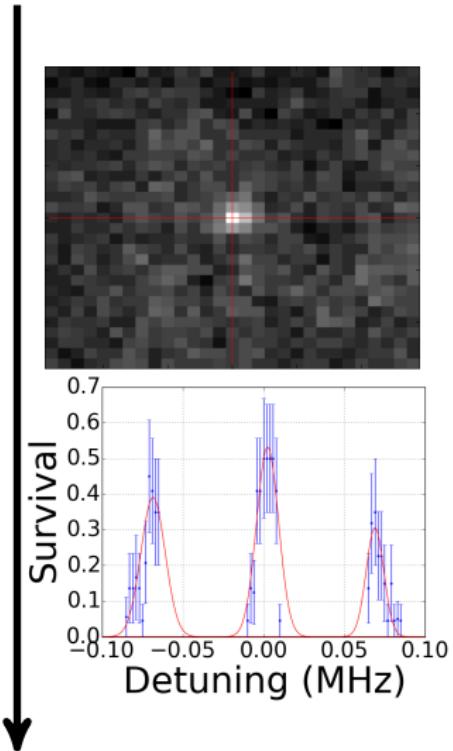
## Current state: Atom cooling

### Cesium

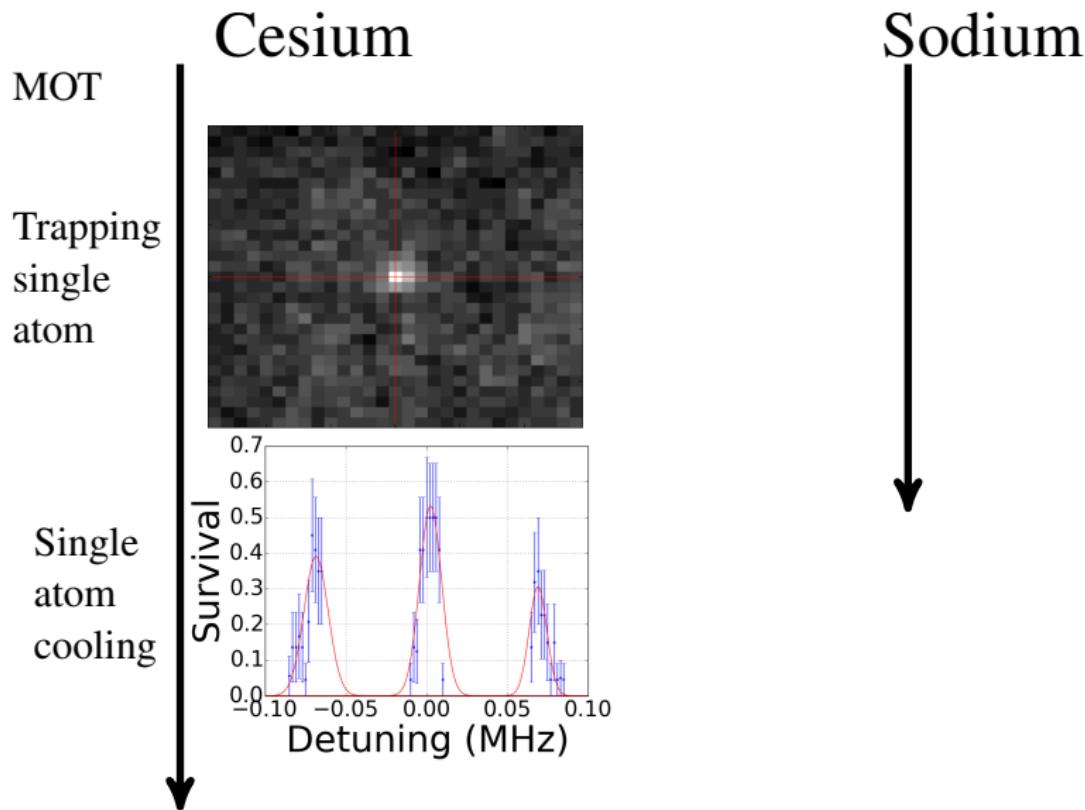
MOT

Trapping  
single  
atom

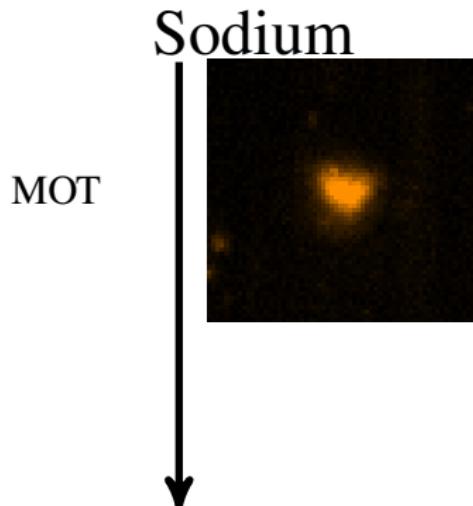
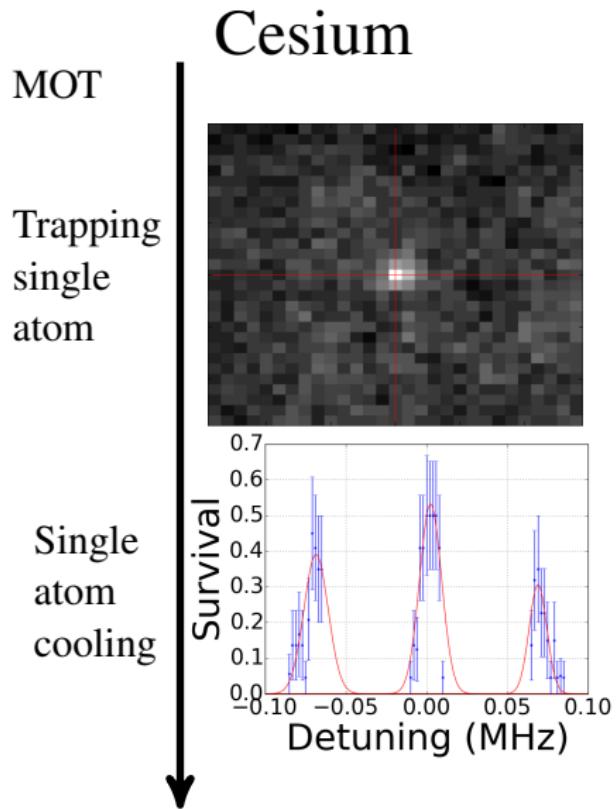
Single  
atom  
cooling



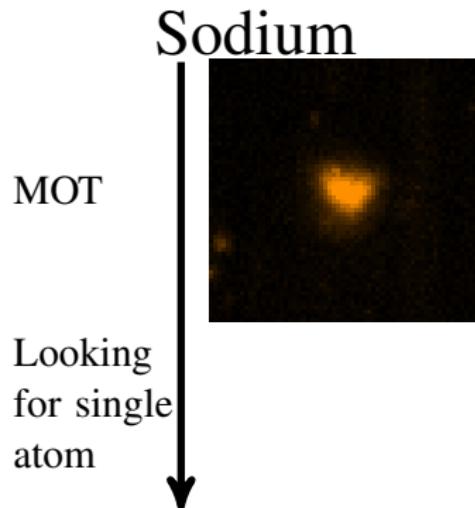
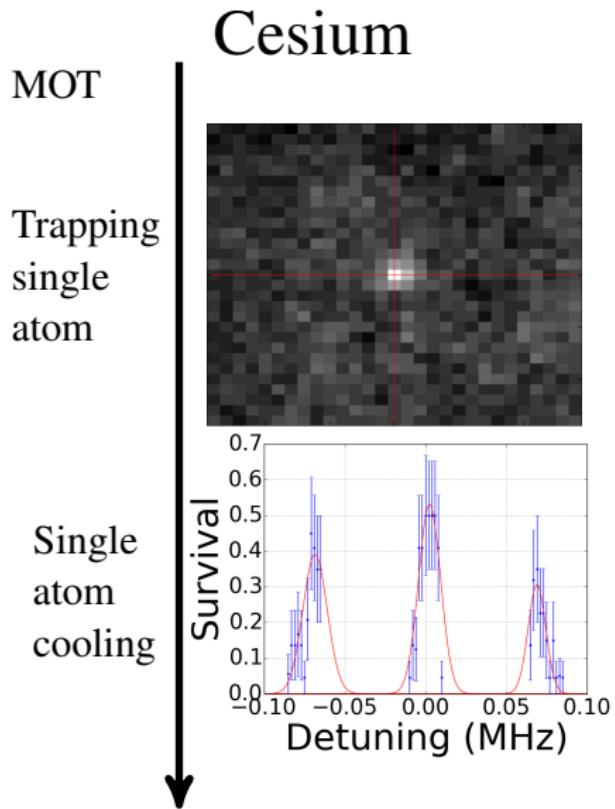
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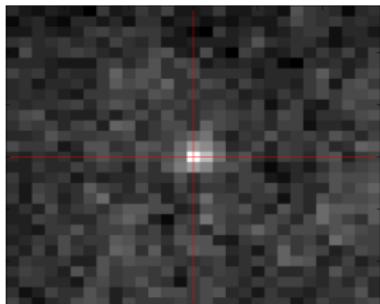
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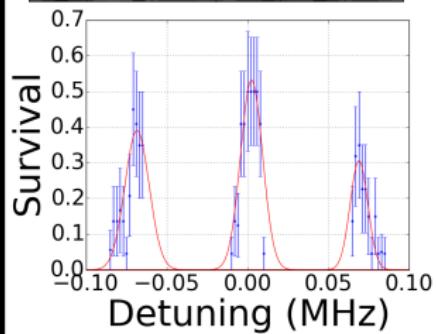
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MOT



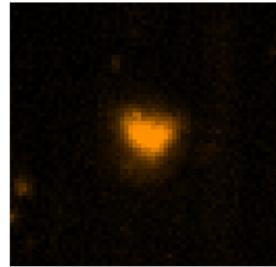
Trapping  
single  
atom

Single  
atom  
cooling



### Sodium

MOT



Looking  
for single  
atom

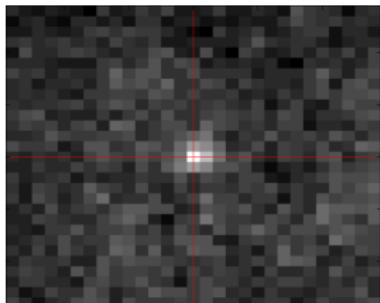
### Problems

- Sodium laser
- MOT stability

## Current state: Atom cooling

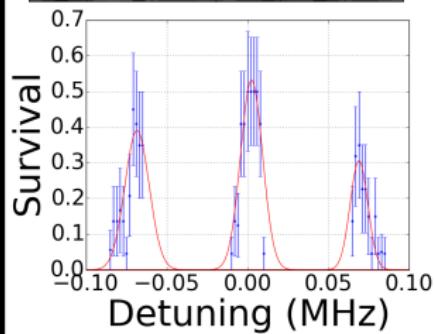
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MOT



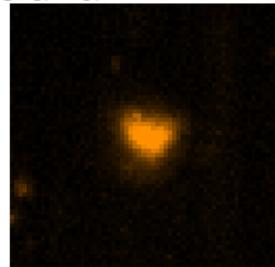
Trapping  
single  
atom

Single  
atom  
cooling



### Sodium

MOT

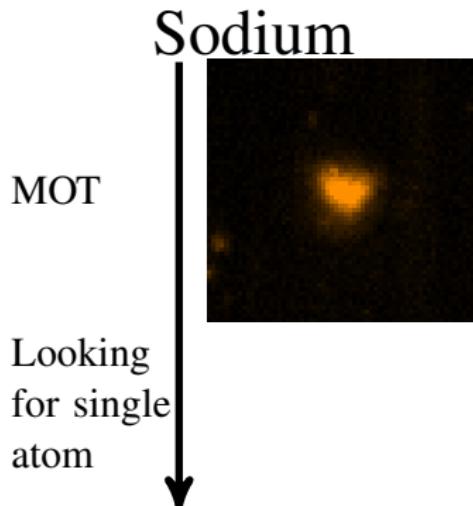
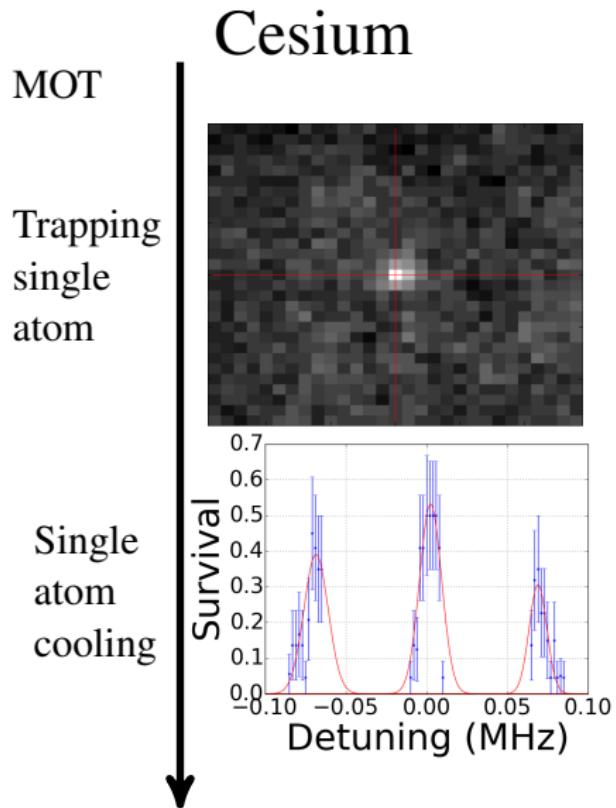


Looking  
for single  
atom

### Problems

- Sodium laser
- MOT stability

## Current state: Atom cooling



### Problems

- Sodium laser
- MOT stability

# Laser system for Sodium

## Sodium wavelengths

- D lines  $\approx$  589nm
- D2 line (Cooling, Imaging)
- D1 line (Pumping, Cooling)
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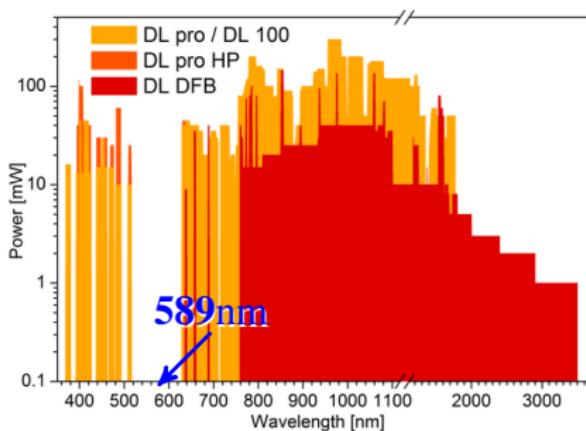
### Using diode laser

- Diode laser spectrum
- Power requirement for frequency doubling
- Diode laser from Innolume Tunable 1175-1280nm
- Waveguide doubler

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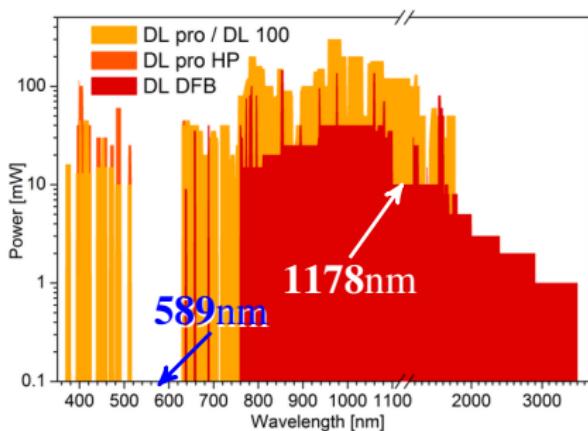


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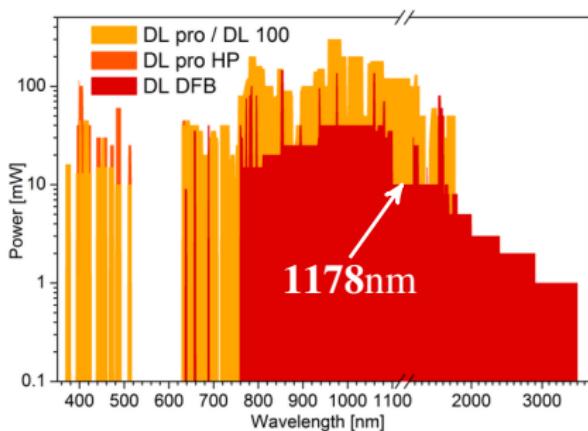
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- ## Using doubled diode laser at $589 \times 2 = 1178\text{nm}$
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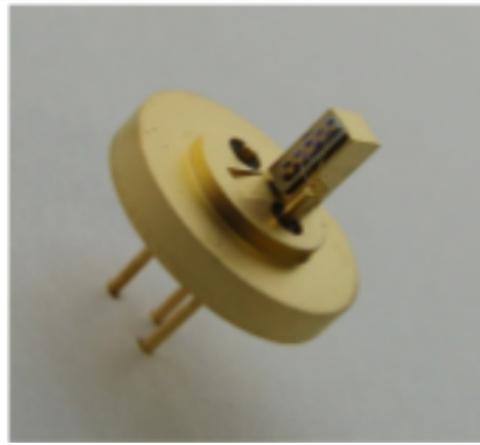
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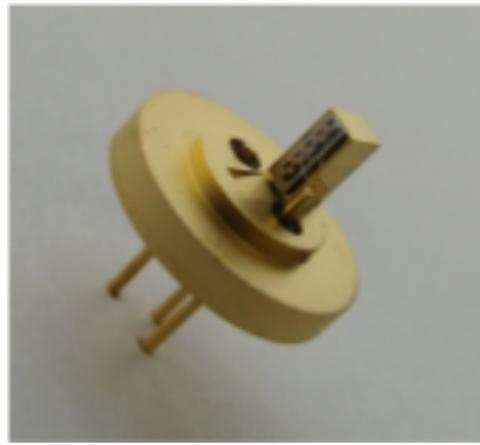


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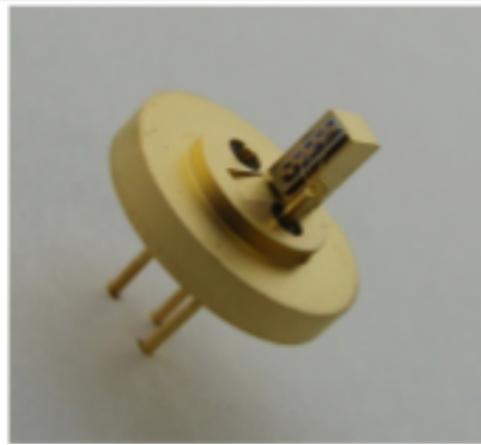


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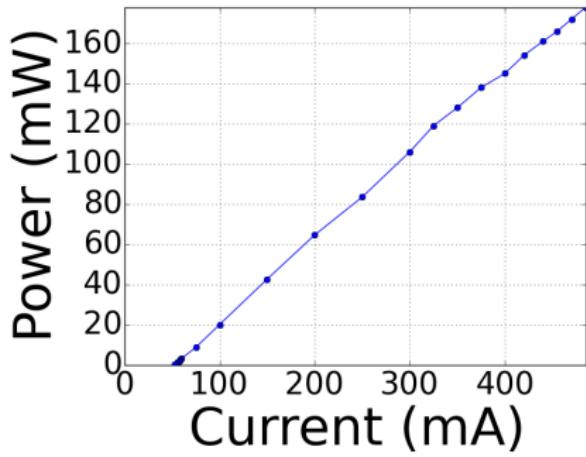
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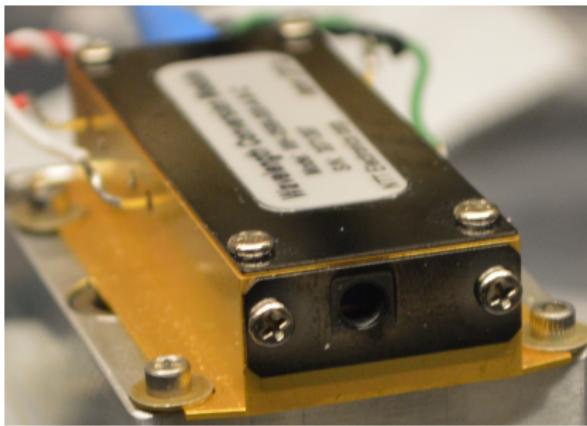


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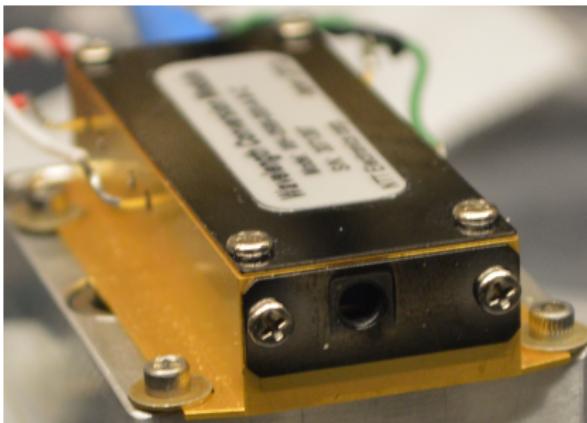


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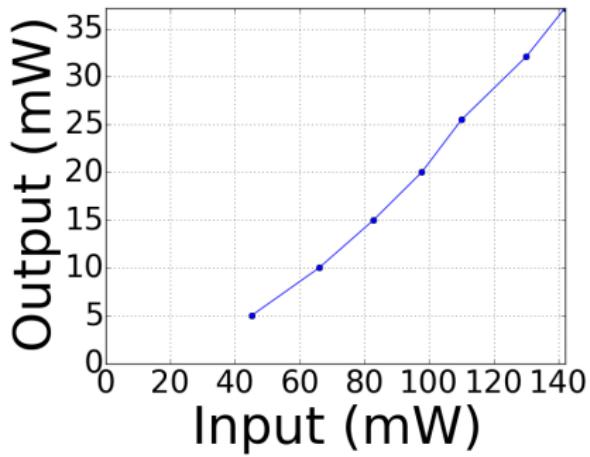
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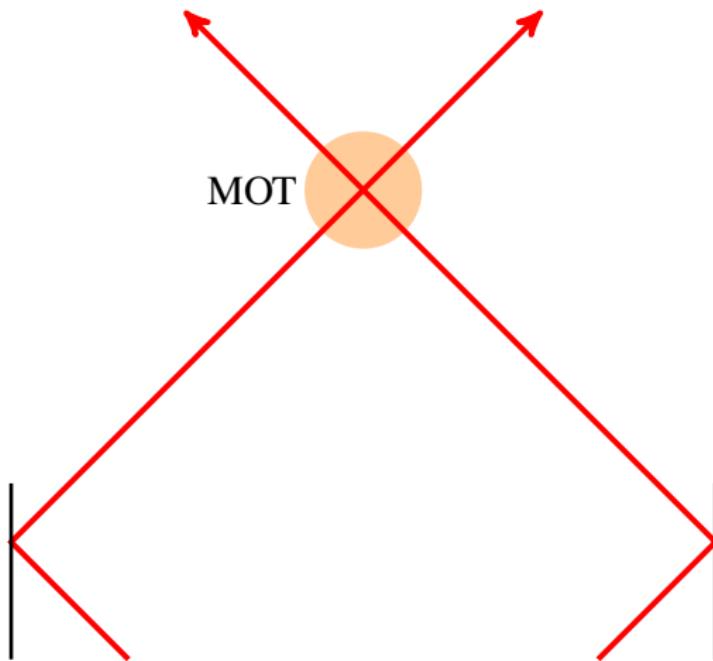


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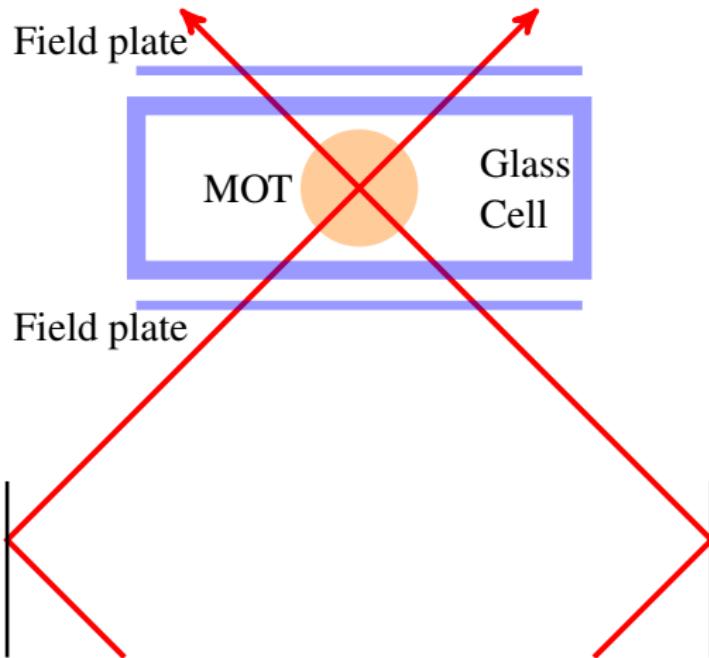


## MOT stability



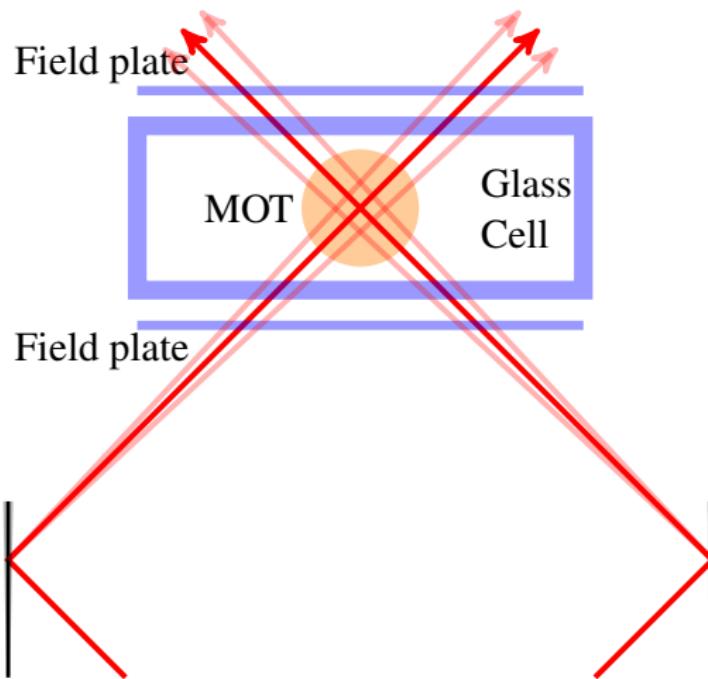
- MOT beam path
- Interference and stability
- Modulating the MOT beams
- Performance

## MOT stability



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# Members