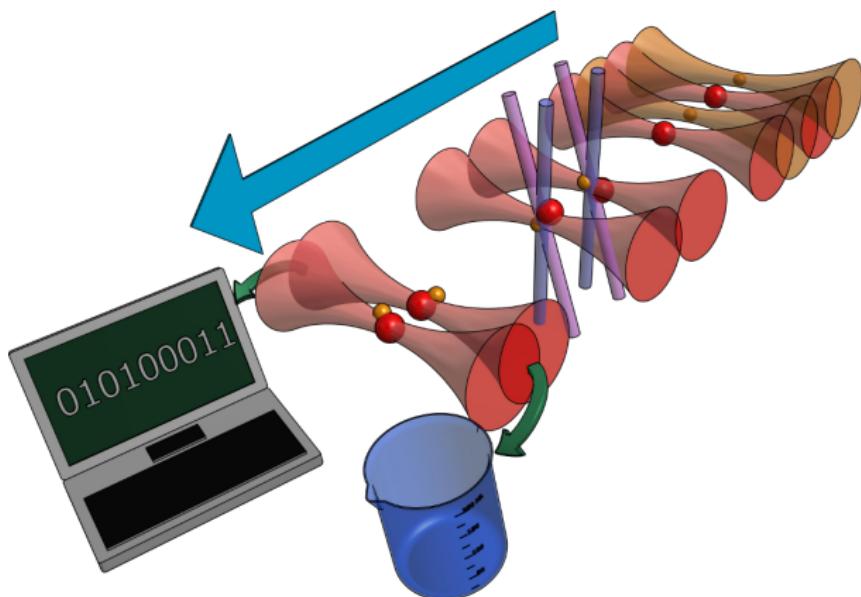


Apparatus for making dipolar NaCs molecules

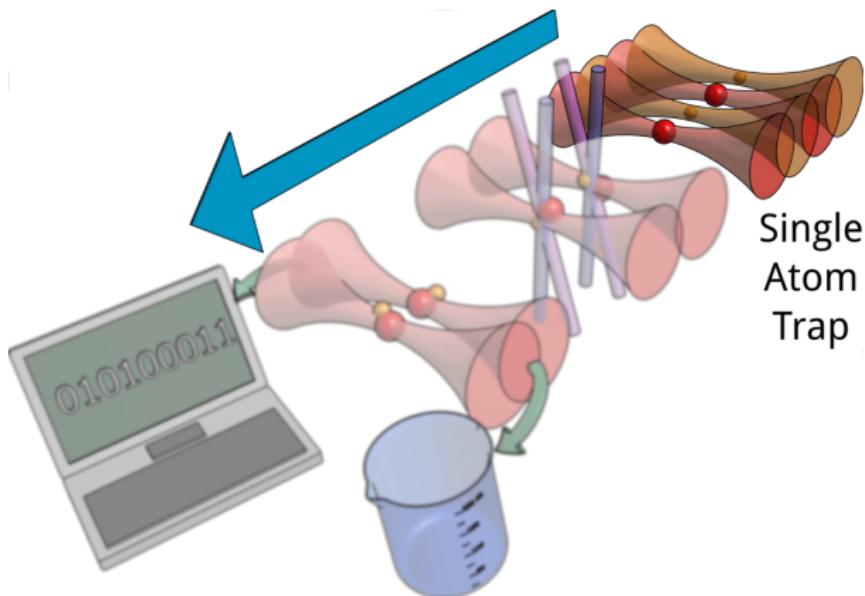


Yichao Yu

May 4, 2015

Harvard/Ni Group

Apparatus for making dipolar NaCs molecules

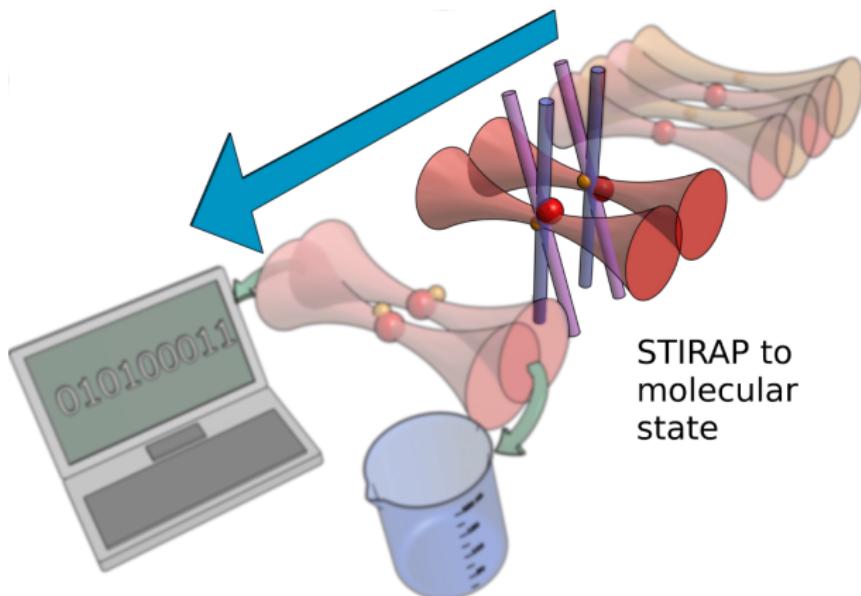


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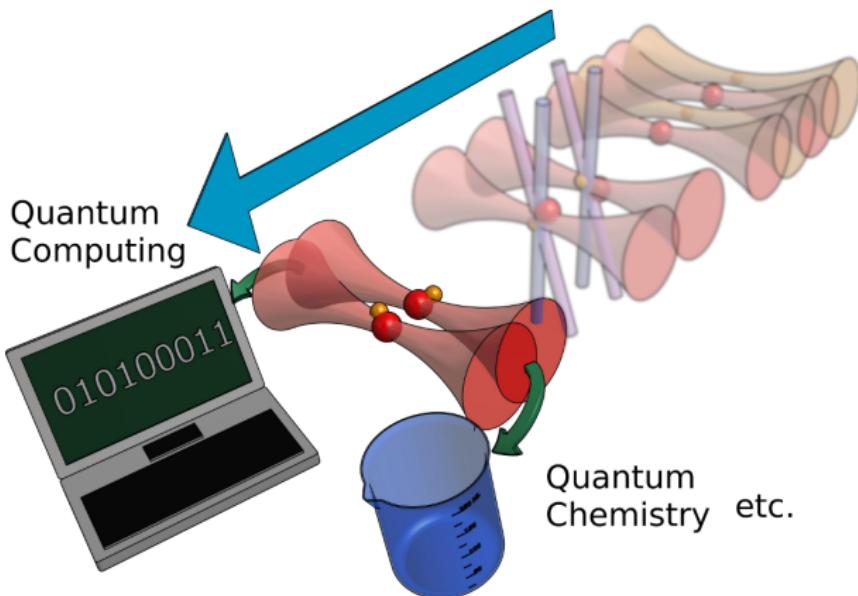


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May 4, 2015

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Apparatus for making dipolar NaCs molecules



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May 4, 2015

Harvard/Ni Group

Current state: Atom cooling

Cesium



Current state: Atom cooling

Cesium

MOT

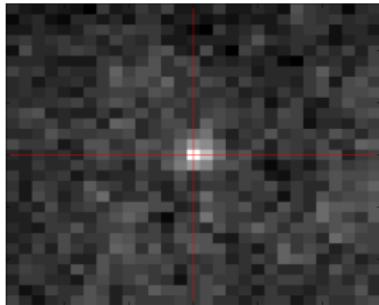


Current state: Atom cooling

Cesium

MOT

Trapping
single
atom



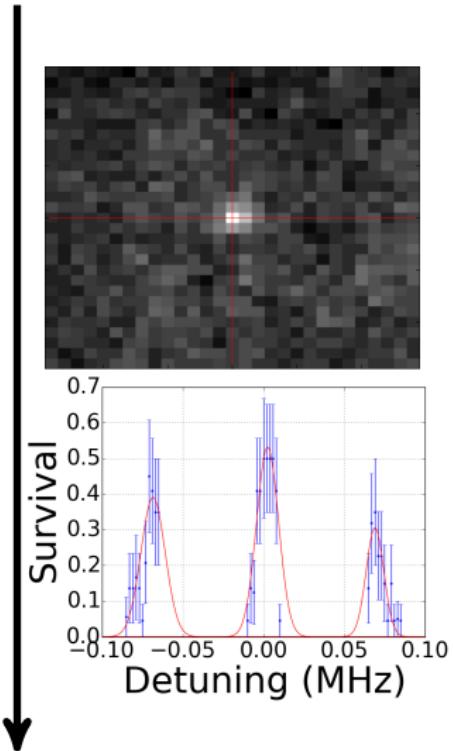
Current state: Atom cooling

Cesium

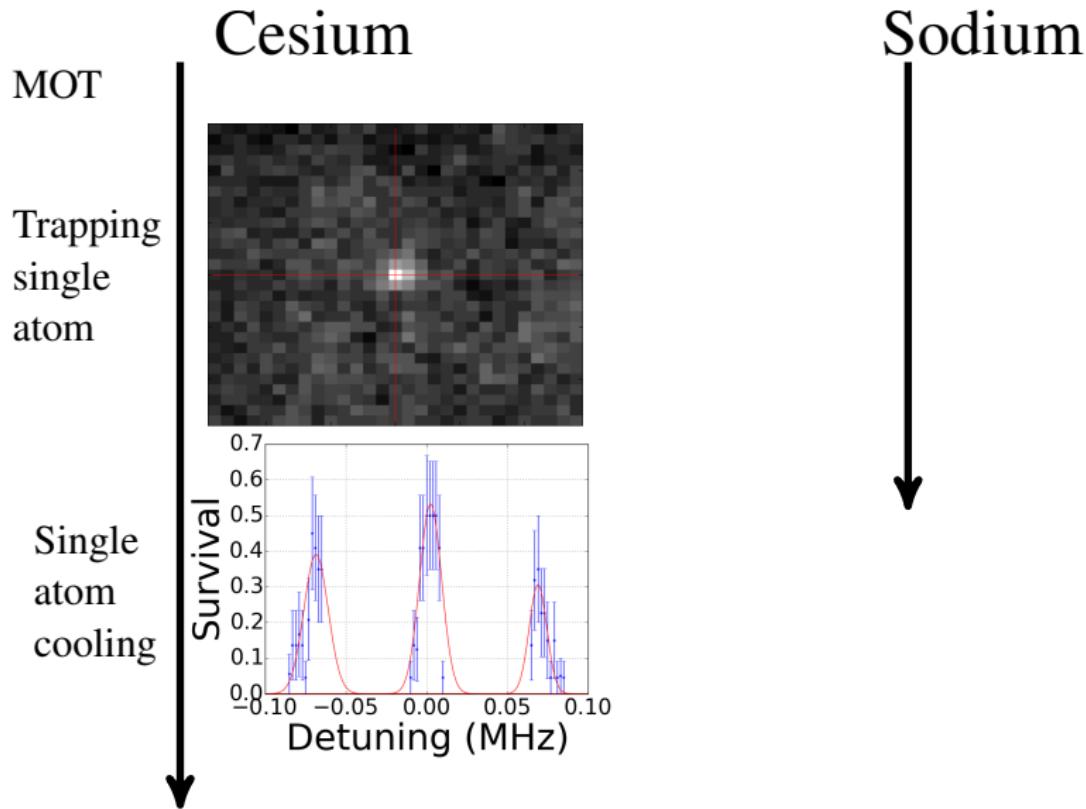
MOT

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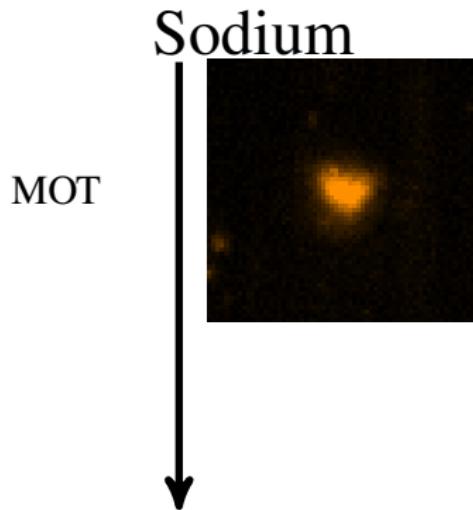
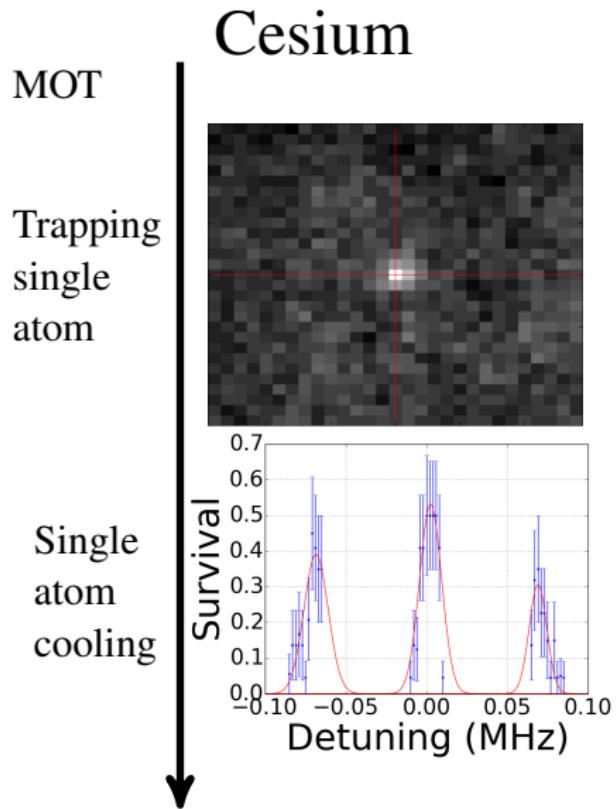
Single
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cooling



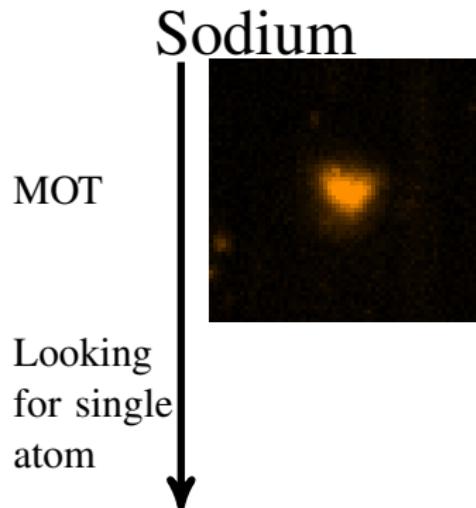
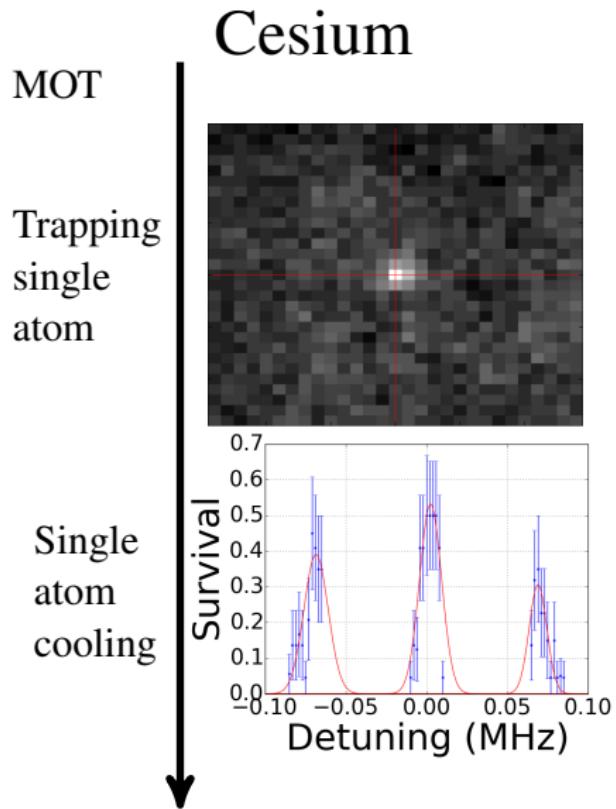
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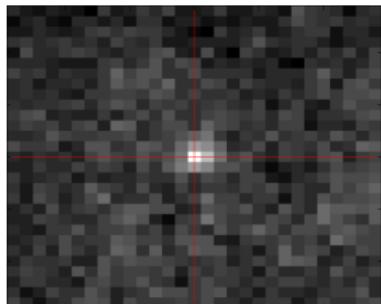
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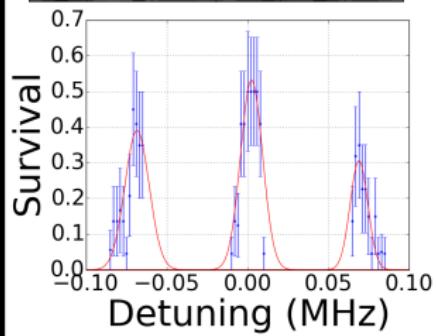
Cesium

MOT



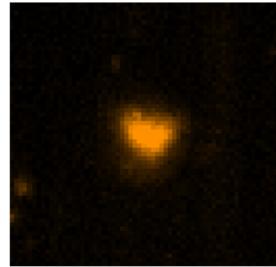
Trapping
single
atom

Single
atom
cooling



Sodium

MOT



Looking
for single
atom

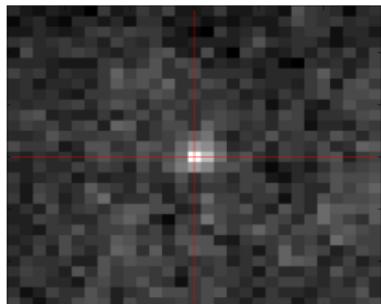
Problems

- Sodium laser
- MOT stability

Current state: Atom cooling

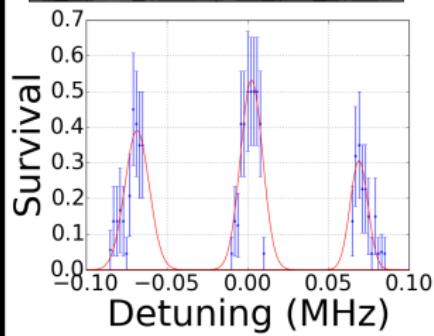
Cesium

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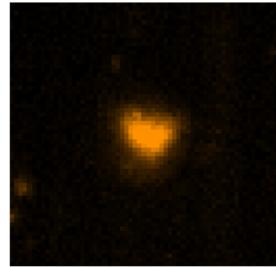
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Single
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Sodium

MOT

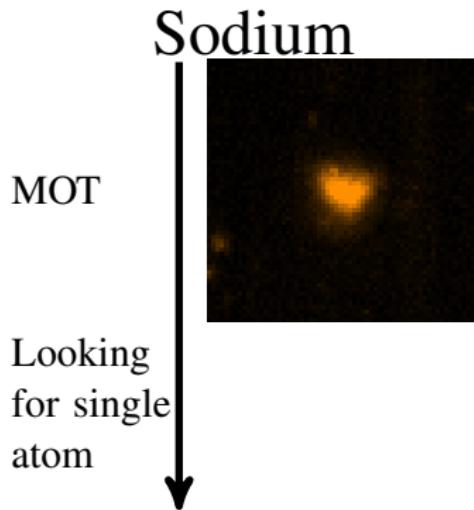
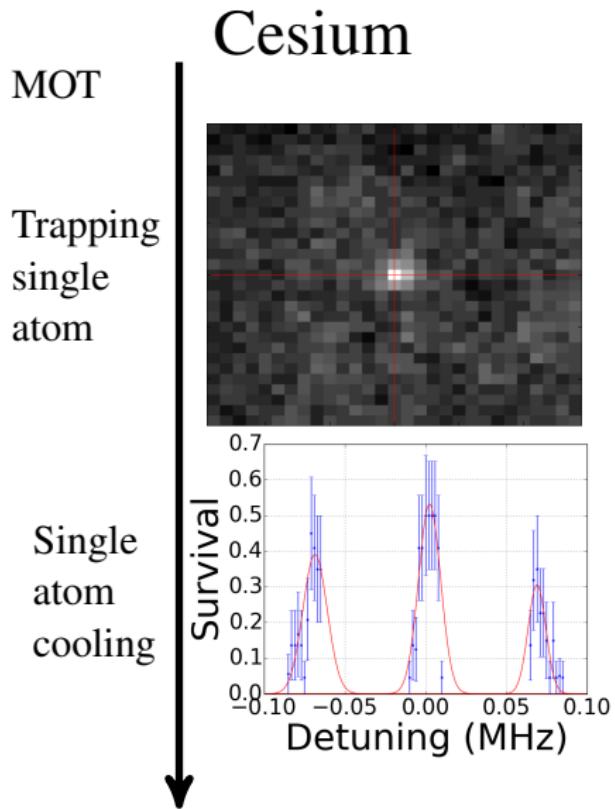


Looking
for single
atom

Problems

- Sodium laser
- MOT stability

Current state: Atom cooling



Problems

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Laser system for Sodium

Sodium wavelengths

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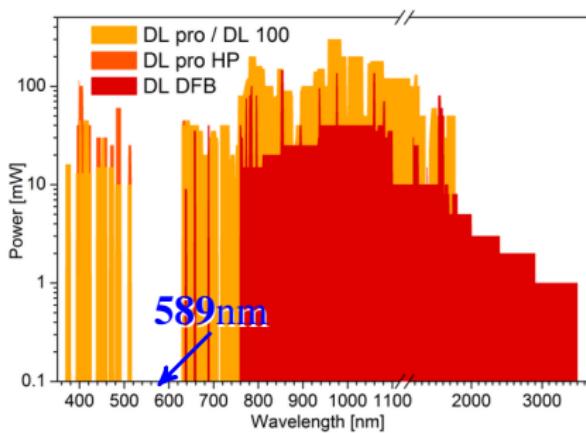
Using diode laser

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

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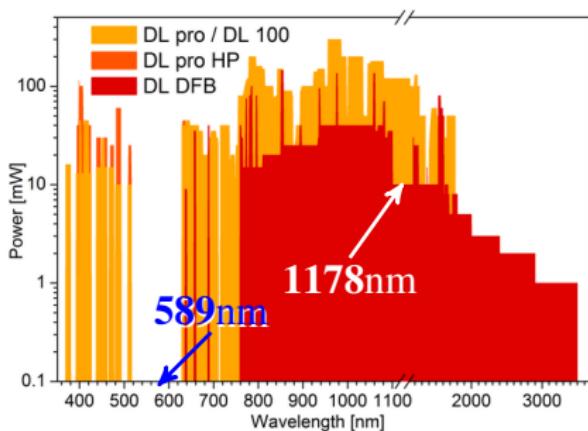


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Laser system for Sodium Sodium wavelengths

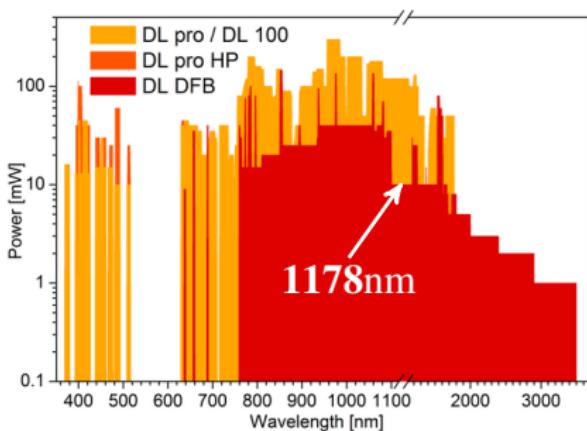
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- ## Using doubled diode laser at $589 \times 2 = 1178\text{nm}$
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Laser system for Sodium Sodium wavelengths

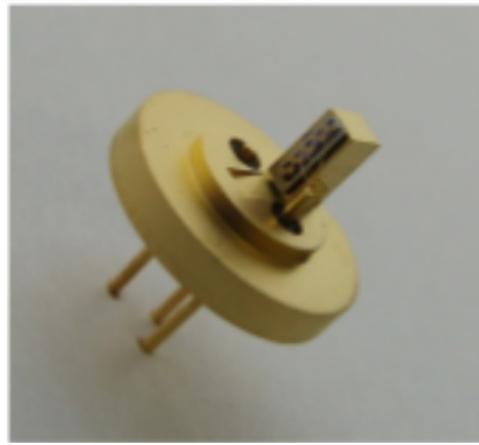
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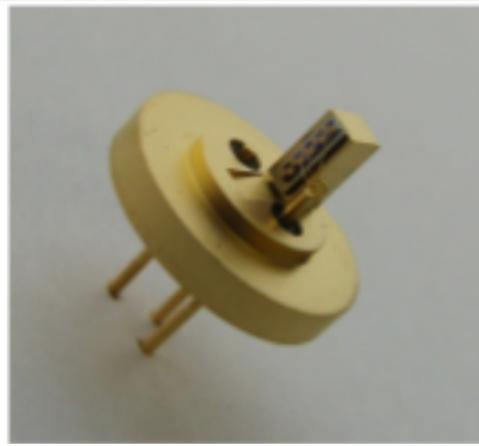


Using doubled diode laser at
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Laser system for Sodium Sodium wavelengths

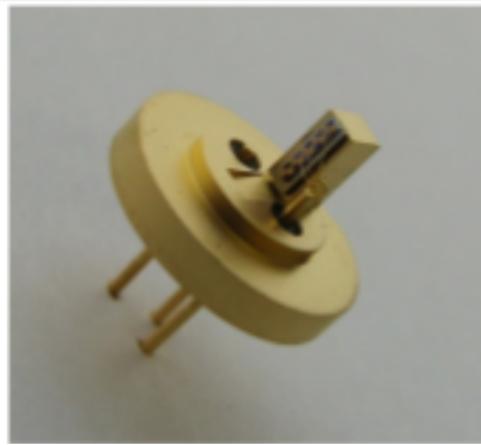
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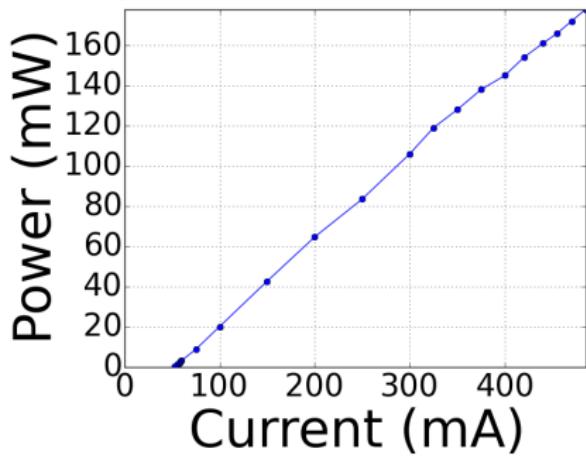
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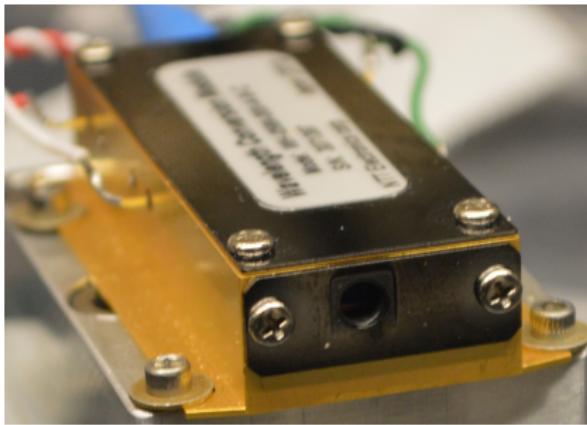


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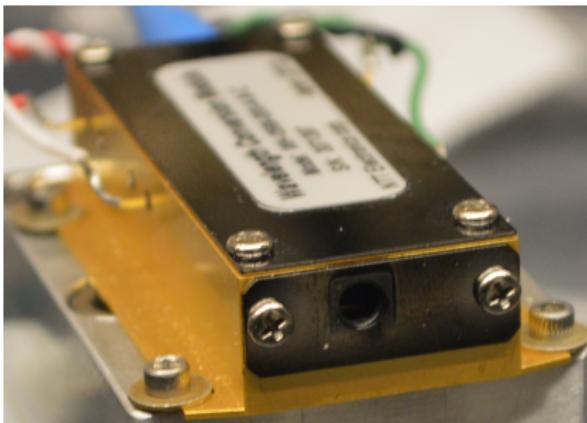


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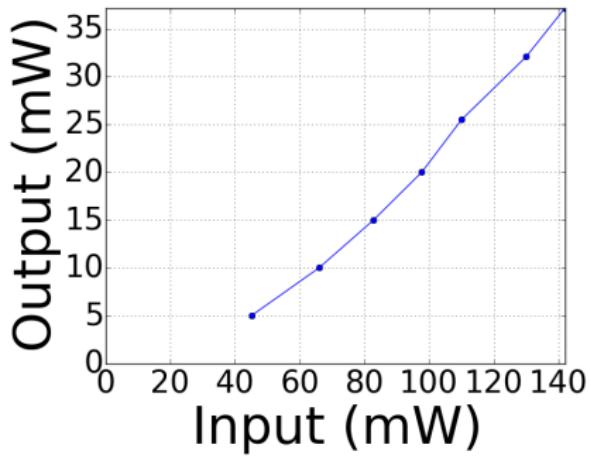
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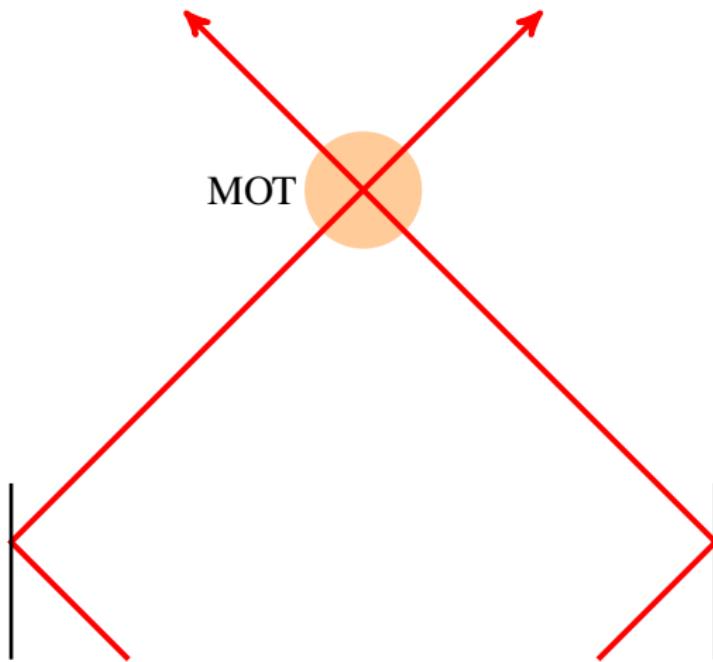


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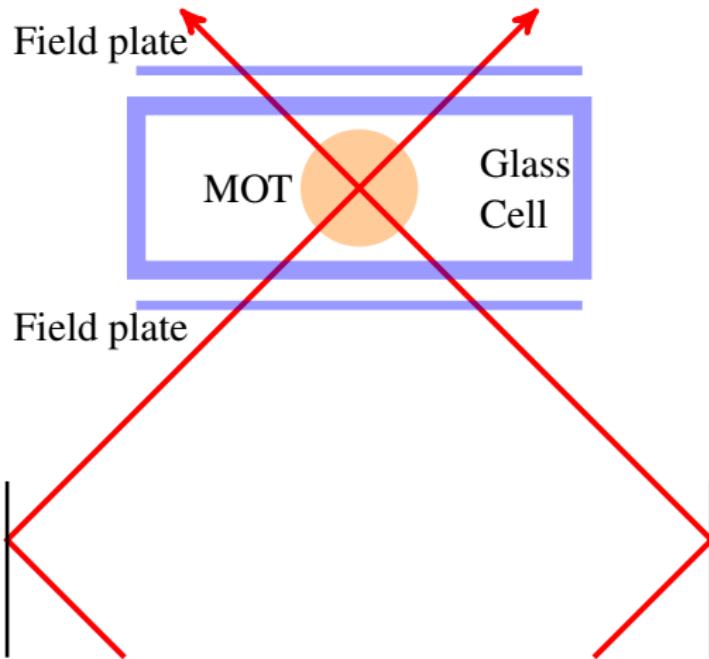


MOT stability



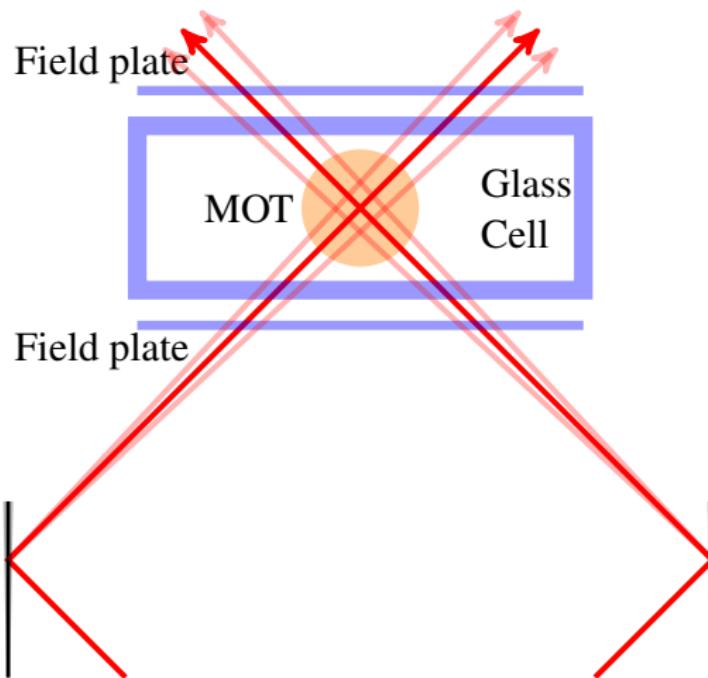
- MOT beam path
- Interference and stability
- Modulating the MOT beams
- Performance

MOT stability



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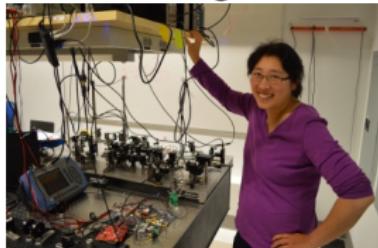


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Prof. Kang-Kuen



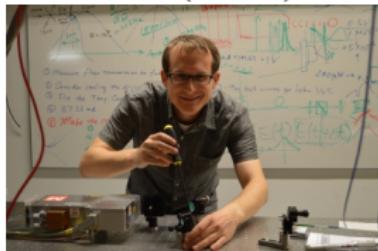
Yu (KRb)



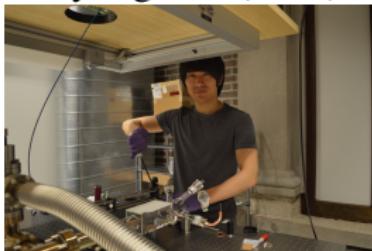
Saahil (Undergrad.)



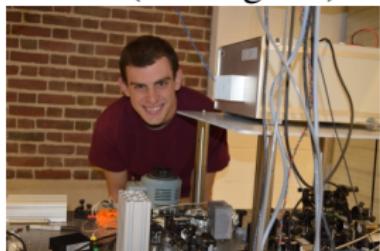
Nick (NaCs)



Hyungmok (KRb)



Will (Undergrad.)



Lee (NaCs)

