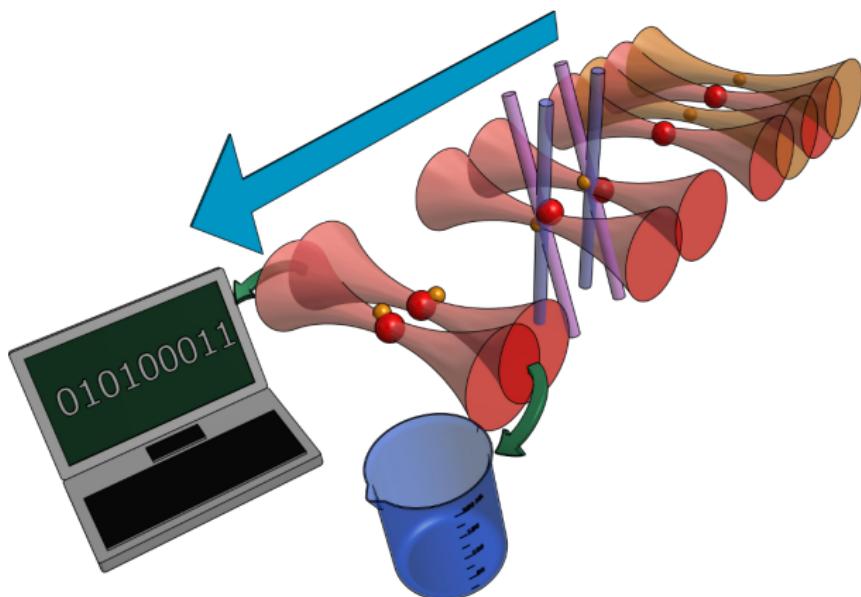
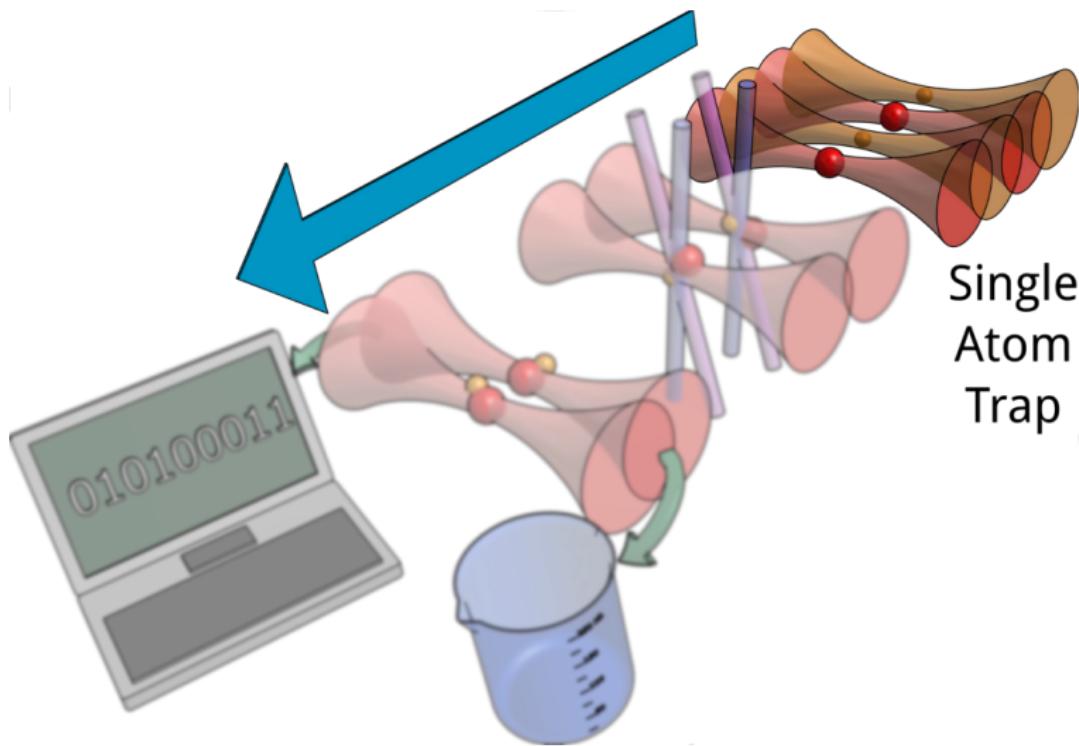


Apparatus for making dipolar NaCs molecules

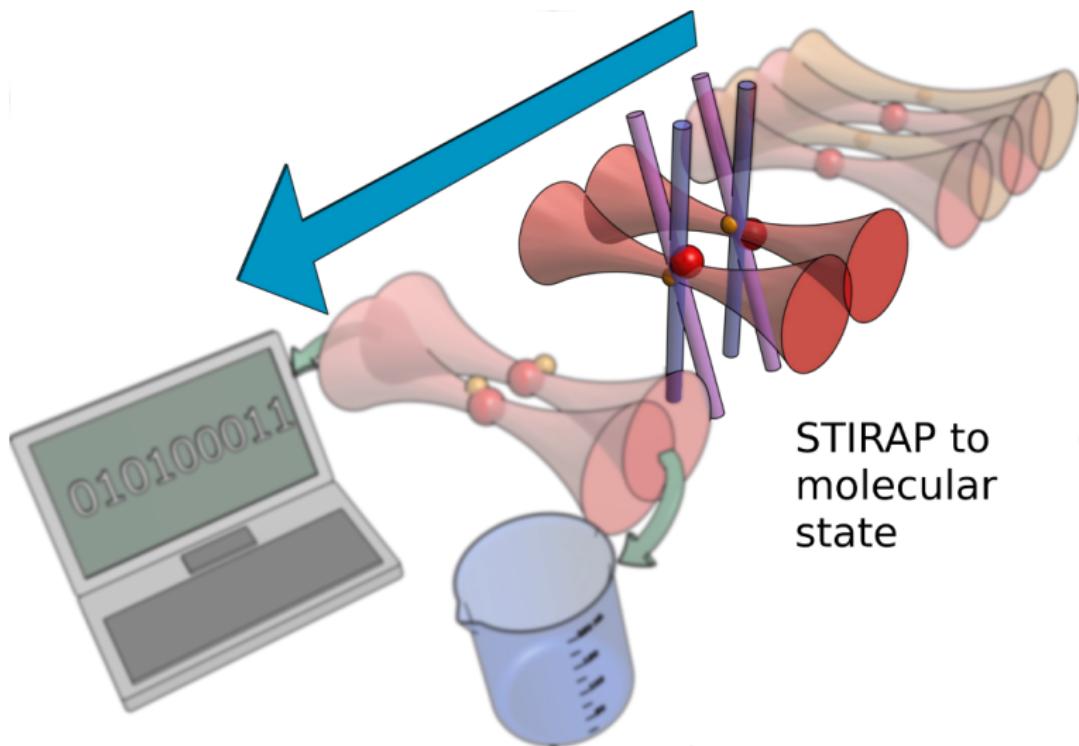


Yichao Yu
May 5, 2015
Harvard/Ni Group

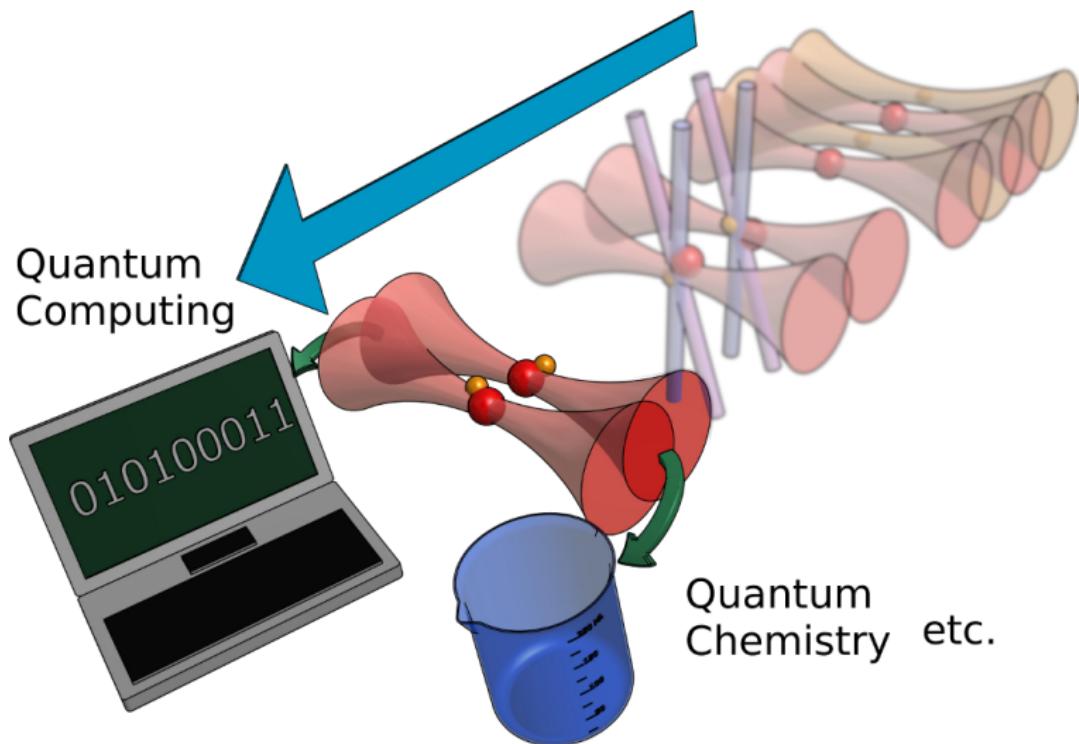
Apparatus for making dipolar NaCs molecules



Apparatus for making dipolar NaCs molecules



Apparatus for making dipolar NaCs molecules



Current state: Atom cooling

Cesium



Current state: Atom cooling

Cesium

MOT

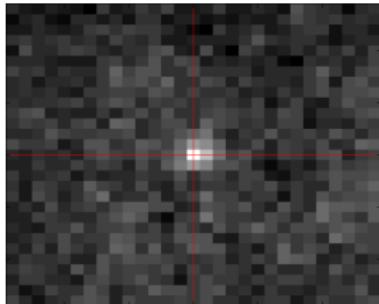


Current state: Atom cooling

Cesium

MOT

Trapping
single
atom



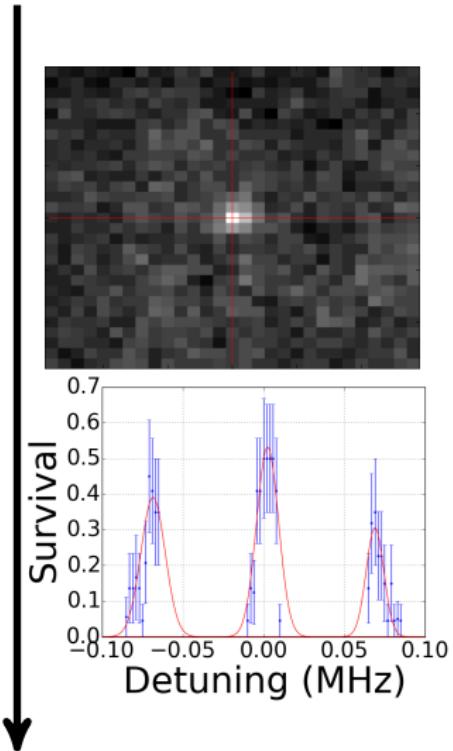
Current state: Atom cooling

Cesium

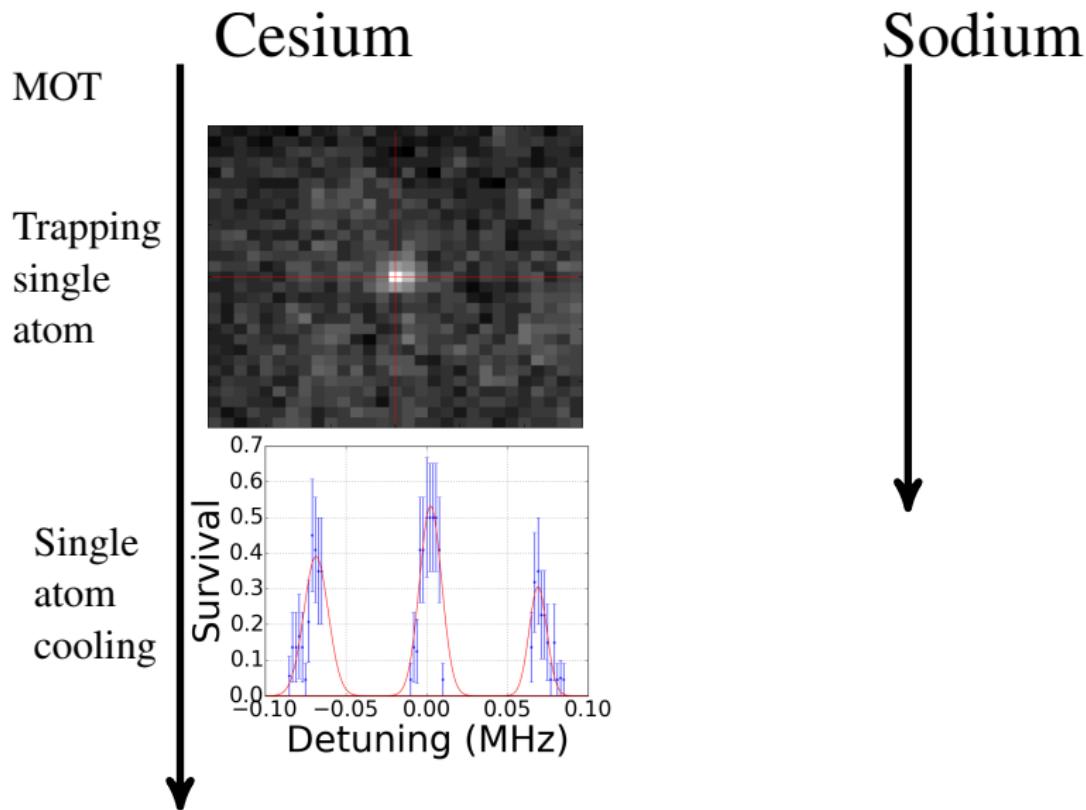
MOT

Trapping
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atom

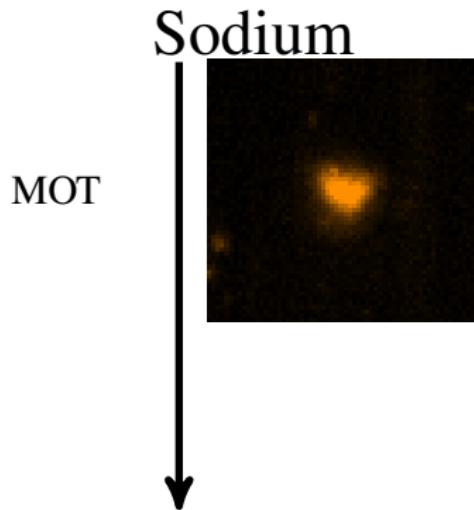
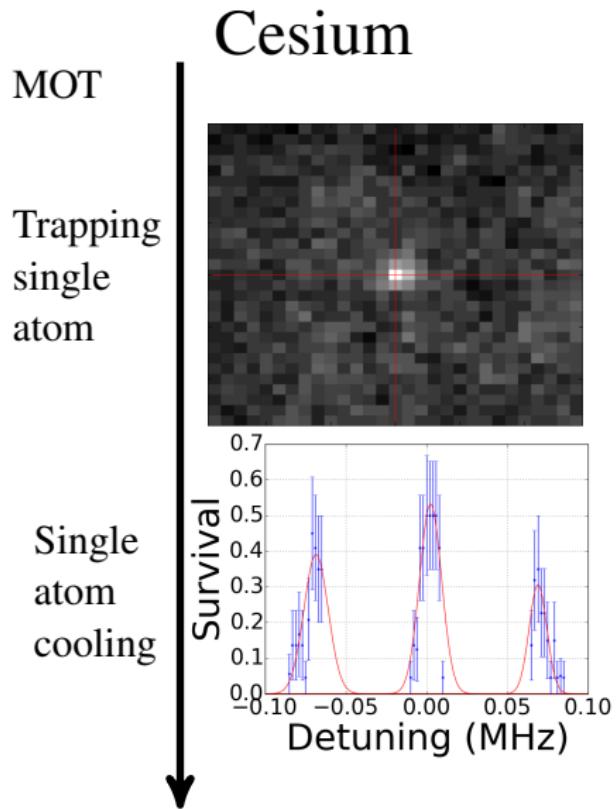
Single
atom
cooling



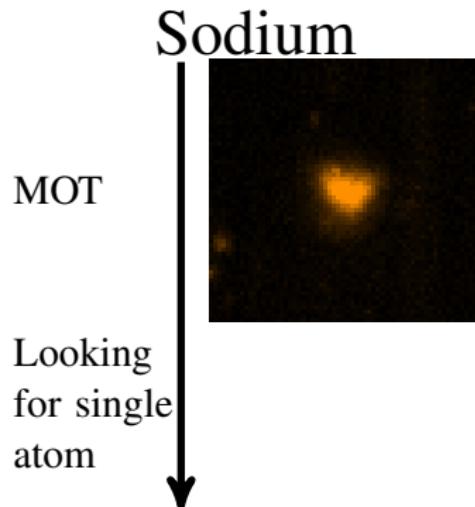
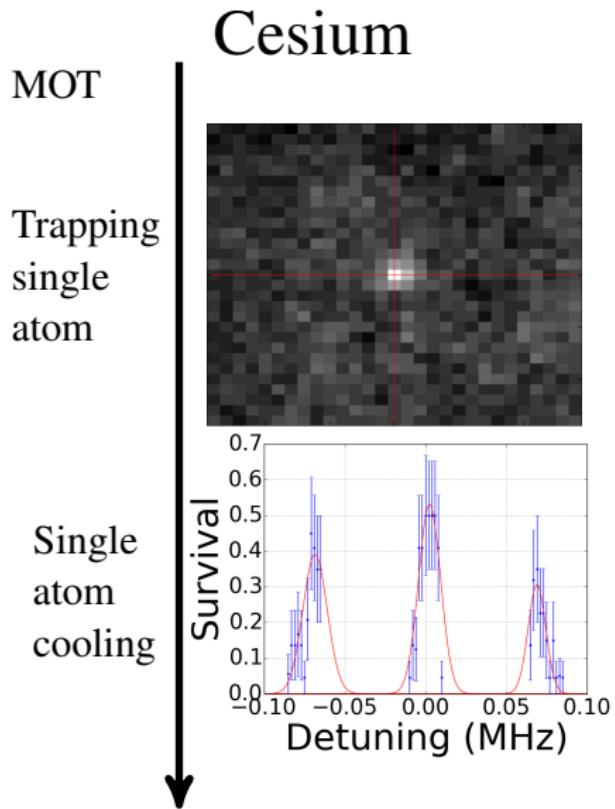
Current state: Atom cooling



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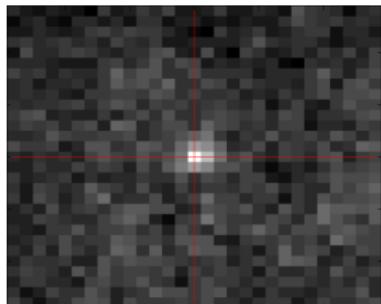
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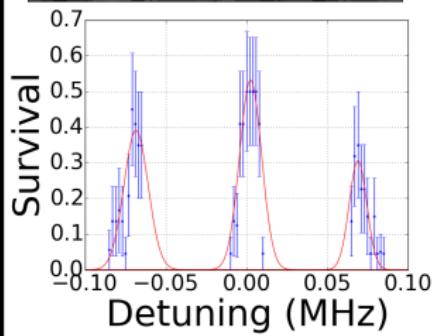
Cesium

MOT



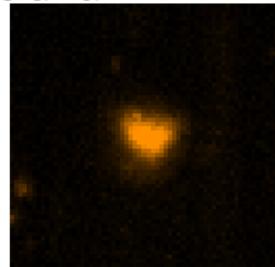
Trapping
single
atom

Single
atom
cooling



Sodium

MOT



Looking
for single
atom

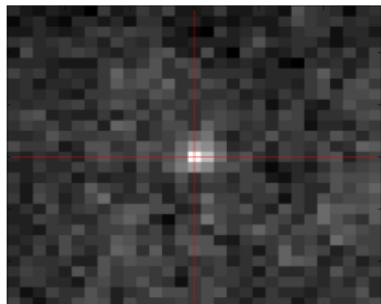
Challenges

- Sodium laser
- MOT stability

Current state: Atom cooling

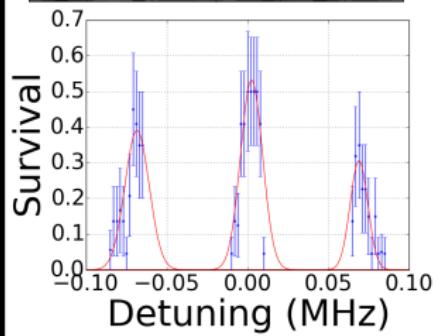
Cesium

MOT



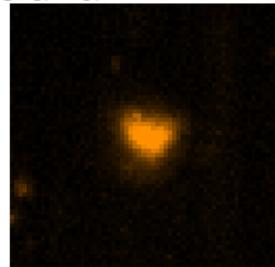
Trapping
single
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Single
atom
cooling



Sodium

MOT



Looking
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atom

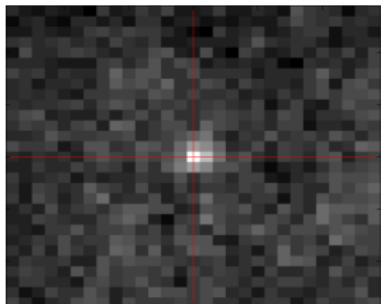
Challenges

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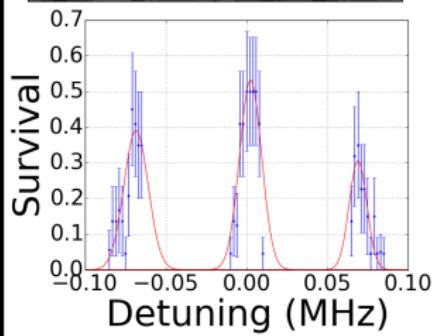
Cesium

MOT



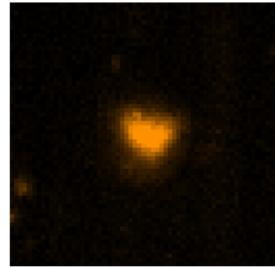
Trapping
single
atom

Single
atom
cooling



Sodium

MOT



Looking
for single
atom

Challenges

- Sodium laser
- MOT stability

Laser system for Sodium

Sodium wavelengths

- D lines $\approx 589\text{nm}$
- D2 line
Cooling and Imaging
- D1 line
Pumping and Cooling
- Off resonance
 $(\delta \approx 10\text{GHz})$
Raman transition

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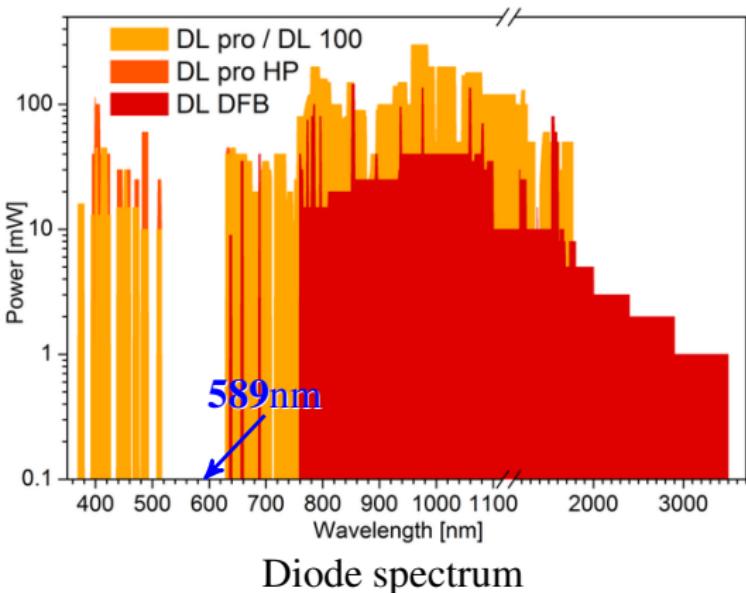
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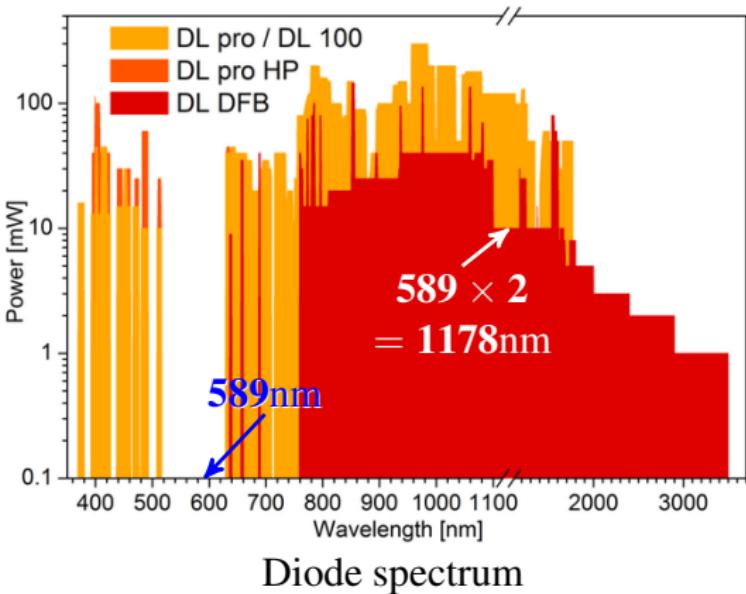


(Picture from Topica)

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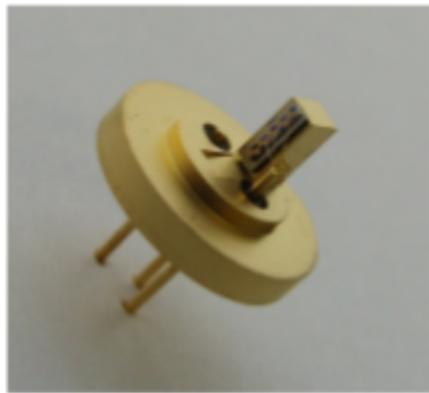


(Picture from Topica)

1178nm seed diode laser

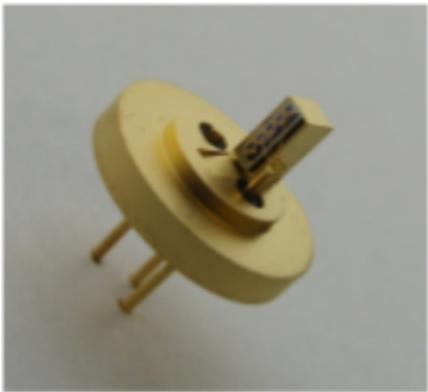
Laser diode from Innolume

- Max power: 200mW
Max current: 500mA
- Tunable over > 100nm: 1175-1280nm



Picture from Innolume

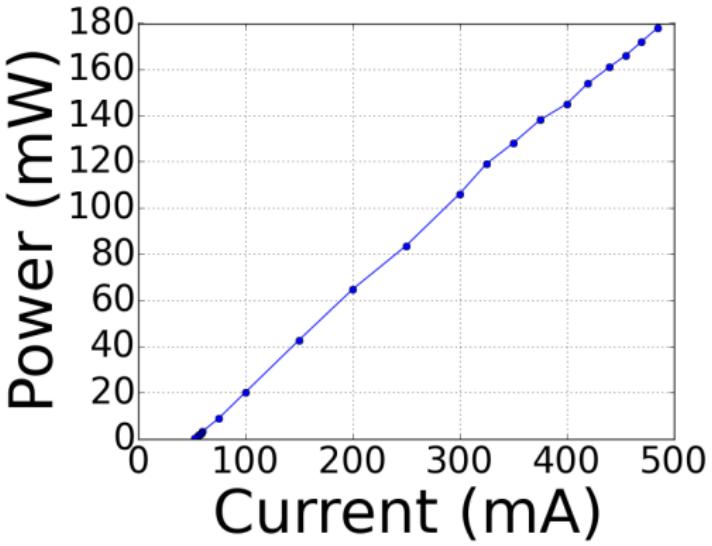
1178nm seed diode laser



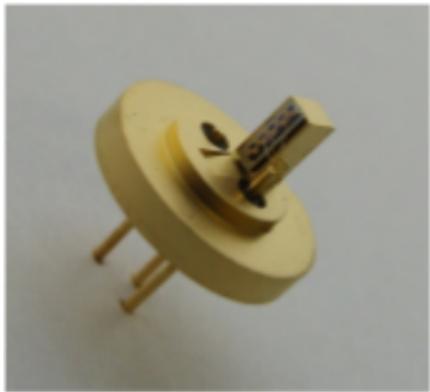
Picture from Innolume

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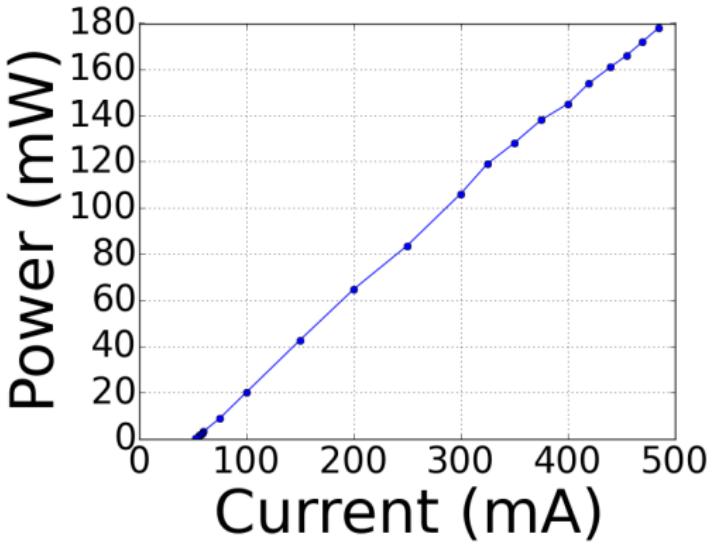
1178nm seed diode laser



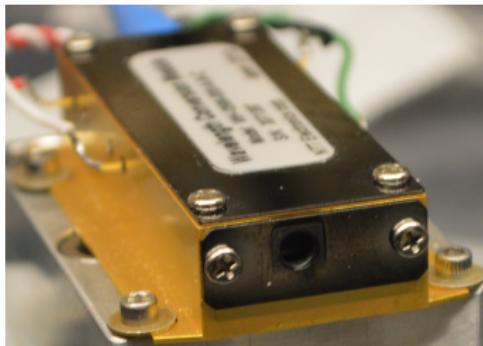
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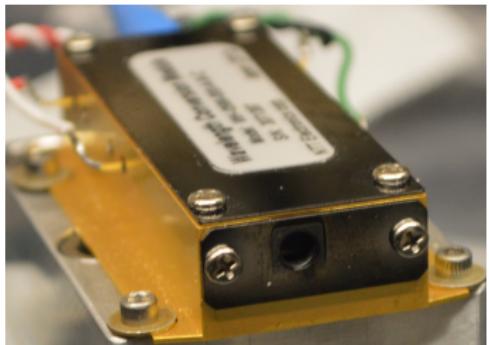


Frequency doubling to 589nm

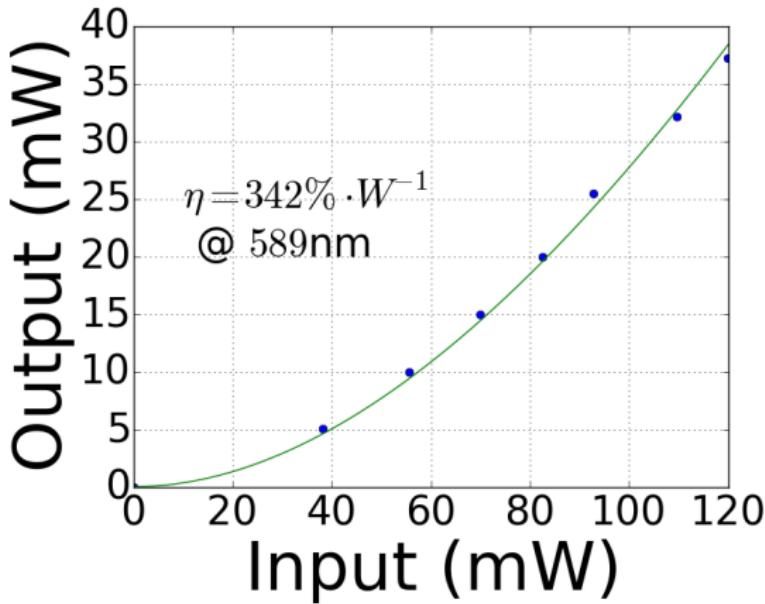


Waveguide doubler module
from NTT Electronics

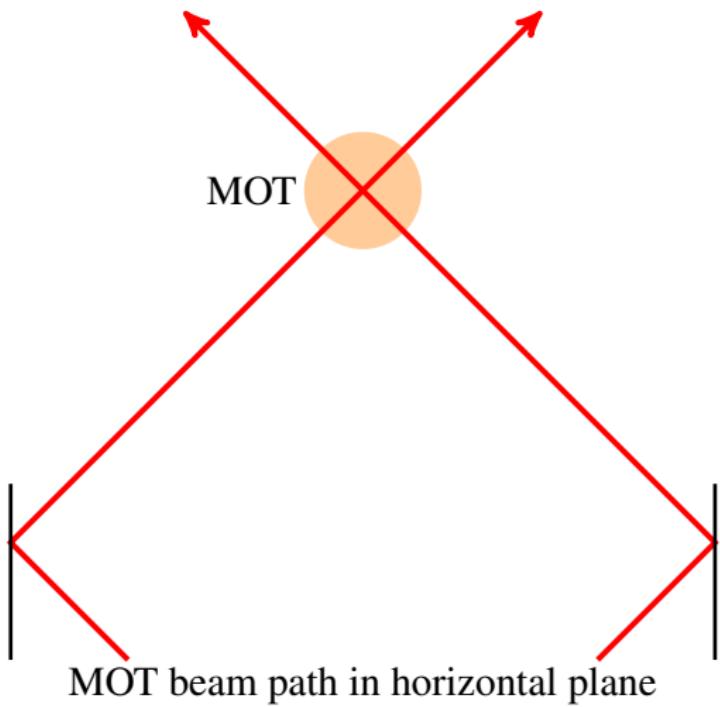
Frequency doubling to 589nm



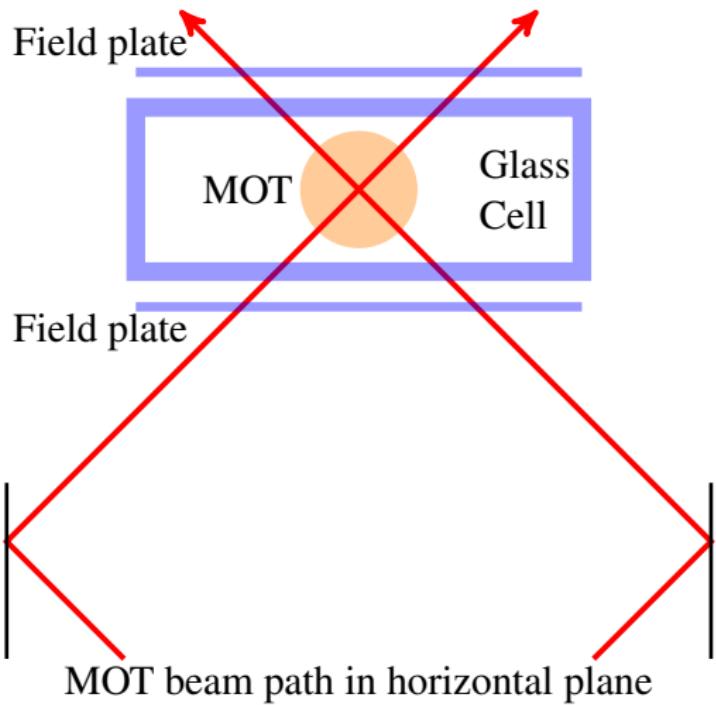
Waveguide doubler module
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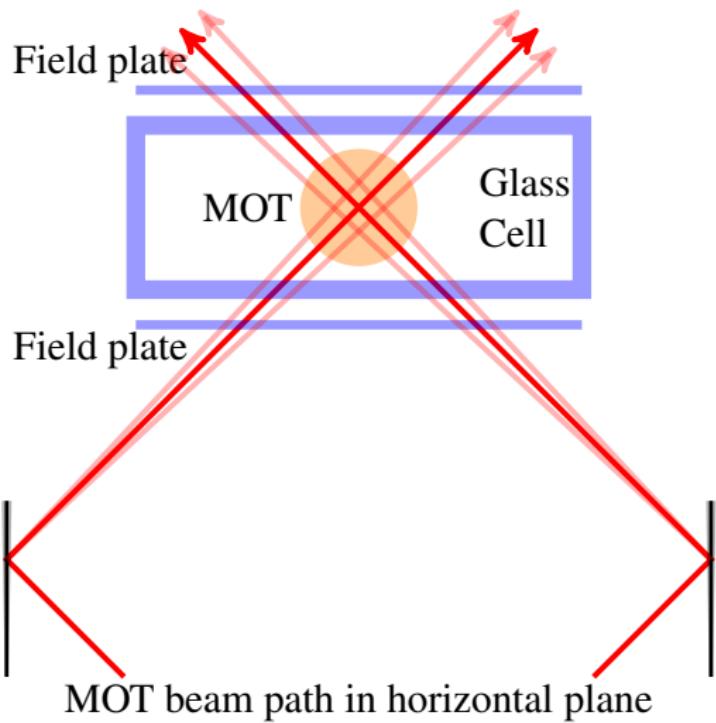
MOT stability



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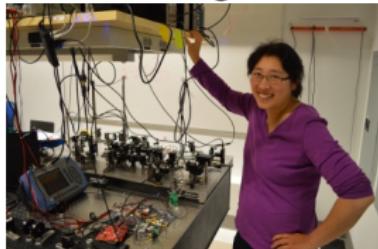


MOT stability

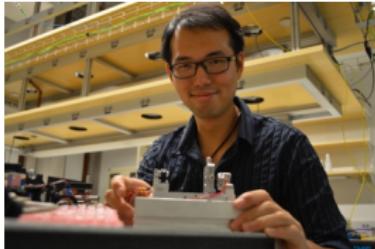


MOT stability

Prof. Kang-Kuen



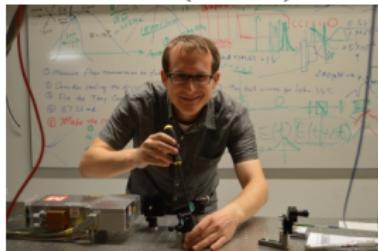
Yu (KRb)



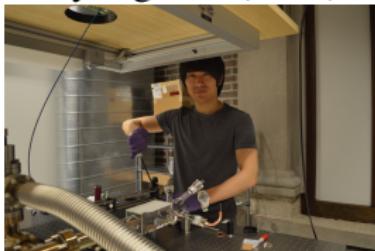
Saahil (Undergrad.)



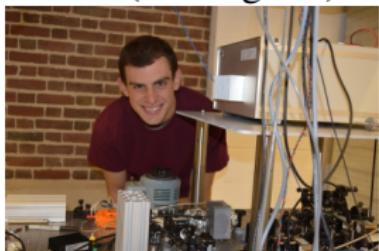
Nick (NaCs)



Hyungmok (KRb)



Will (Undergrad.)



Lee (NaCs)

