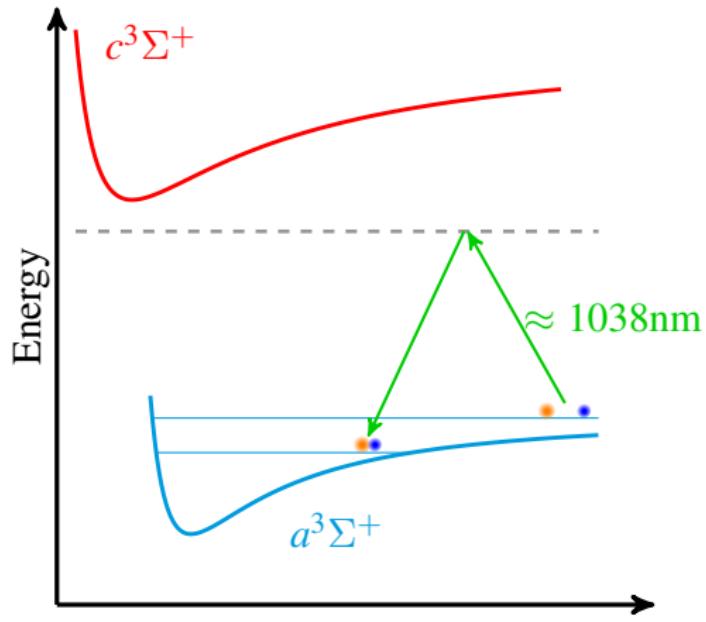


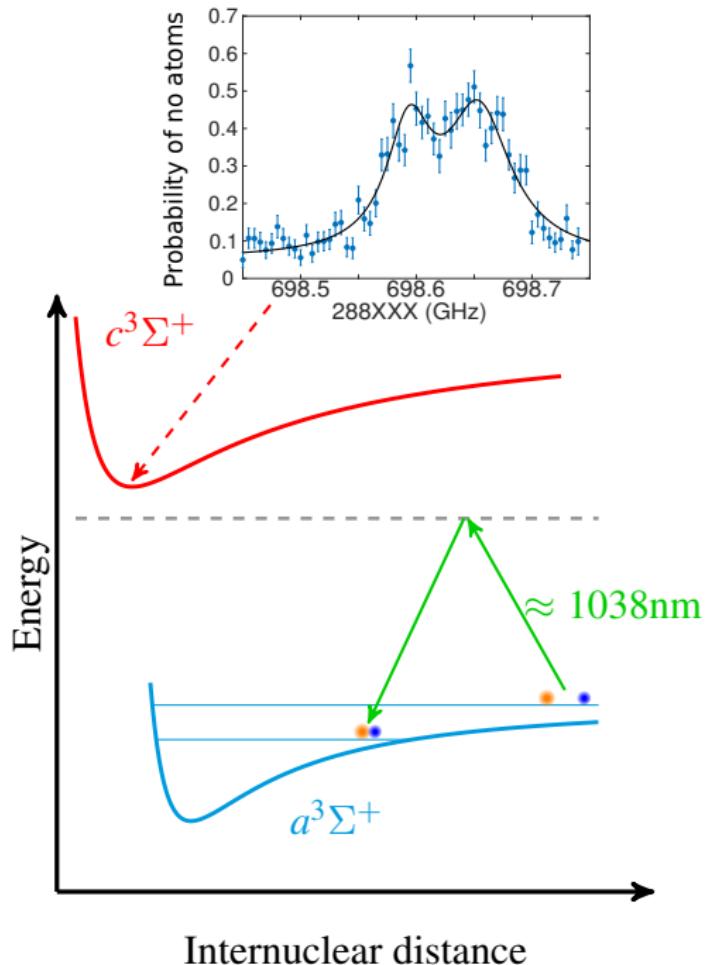
# NaCs lab update

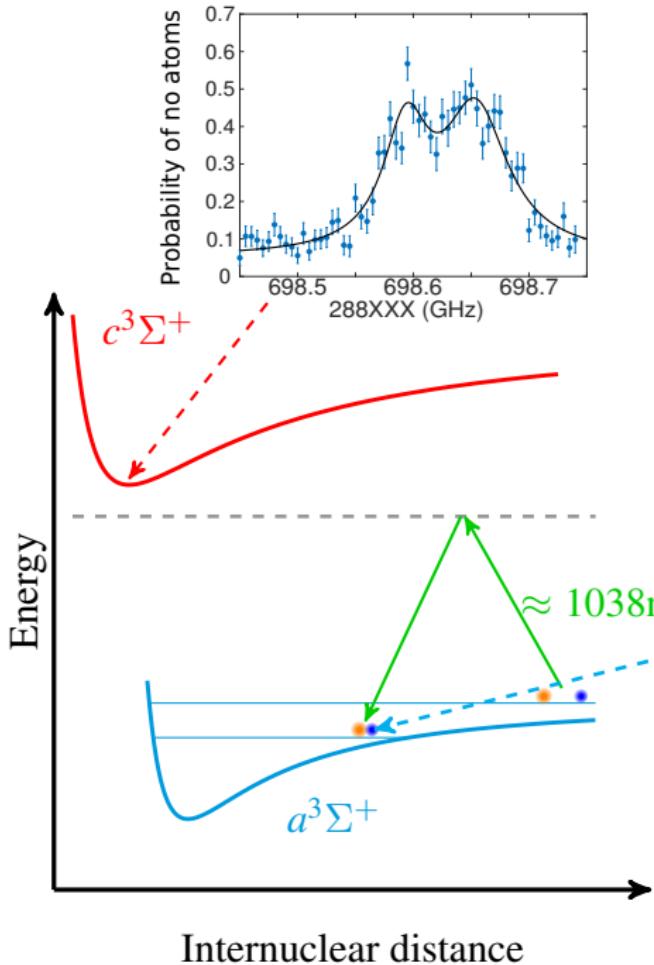
Yichao Yu

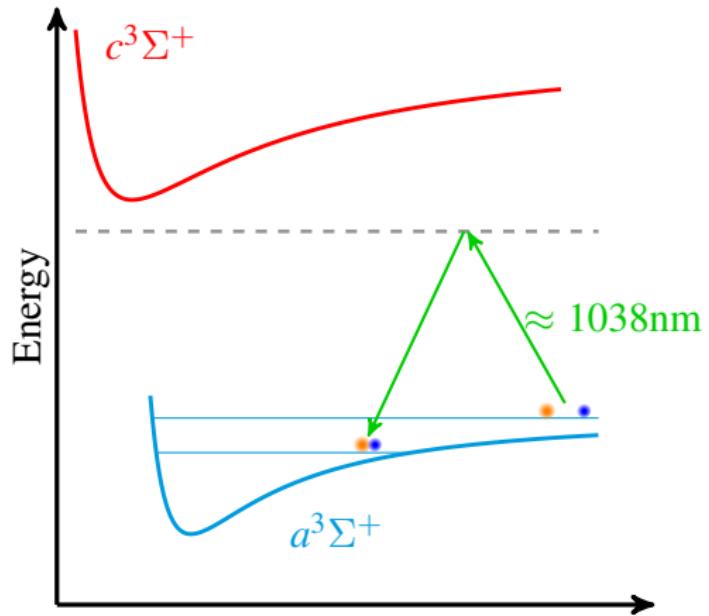
Ni Group

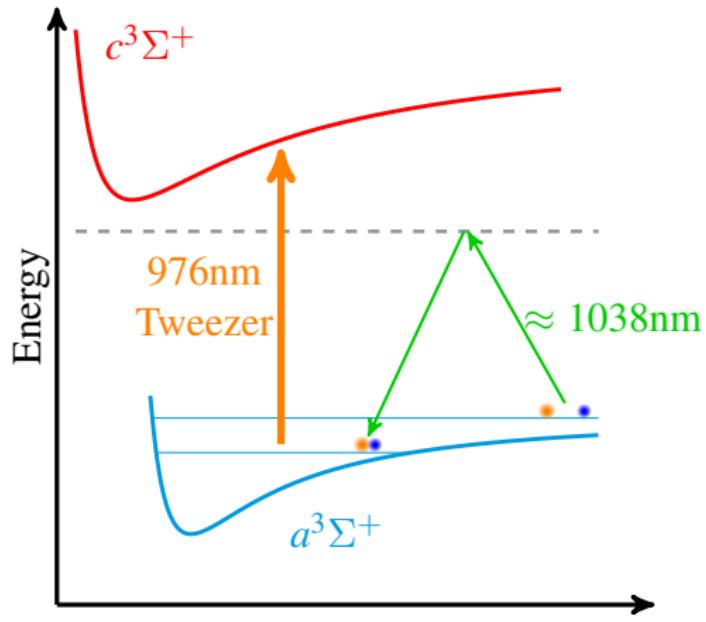
Sep. 28, 2018











**1038nm:**

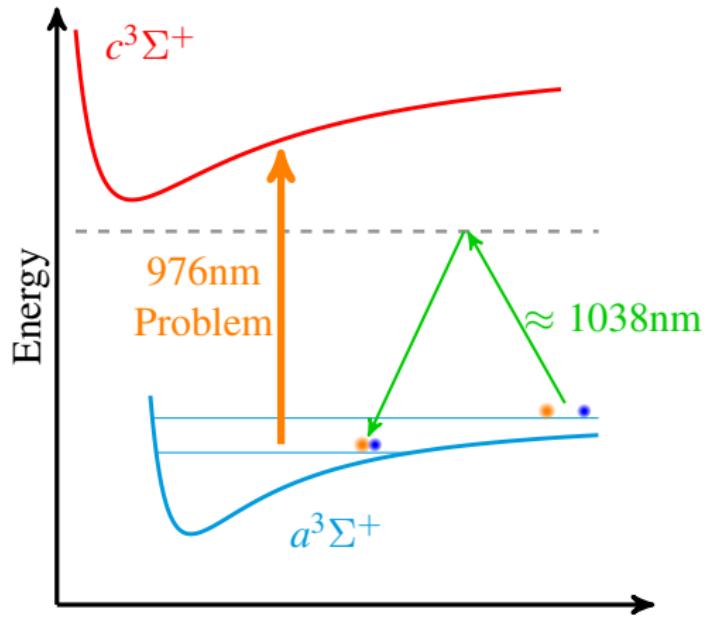
Power: 10mW

Size:  $12\mu\text{m}$

**976nm:**

Power: 15mW

Size:  $0.7\mu\text{m}$



**1038nm:**

Power: 10mW

Size:  $12\mu\text{m}$

Rabi frequency:  $\approx 100\text{Hz}$

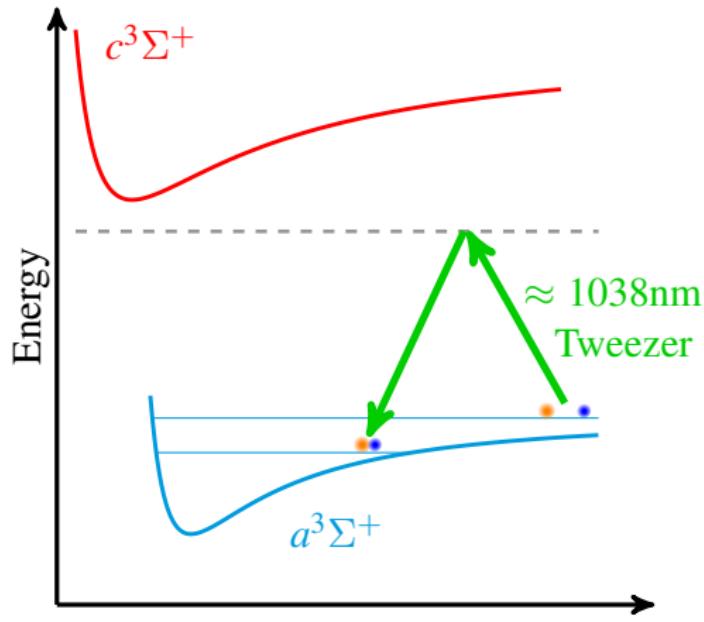
**976nm:**

Power: 15mW

Size:  $0.7\mu\text{m}$

Stark shift: 300kHz

Scattering:  $\approx 10\text{kHz}$



**1038nm:**

Power: 15mW

Size:  $0.7\mu\text{m}$

Rabi frequency:  $\approx 3\text{kHz}$

Stark shift:  $\approx 200\text{kHz}$

Scattering:  $\approx 160\text{Hz}$

(at  $\delta = -100\text{GHz}$ )

# Interaction shift

## Goal

- Calculate binding energy
- Refine Feshbach resonance prediction

# Interaction shift

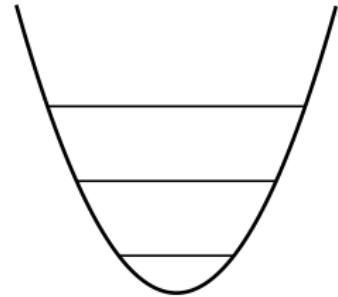
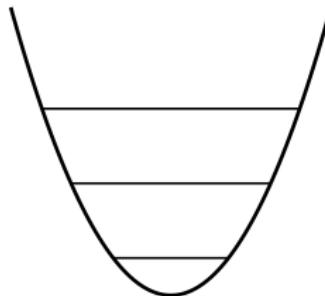
## Goal

- Calculate binding energy
- Refine Feshbach resonance prediction

# Interaction shift

## Goal

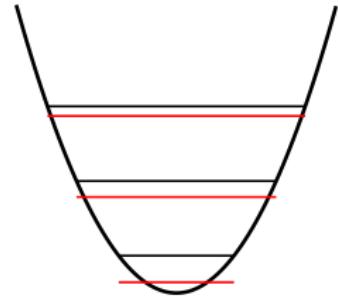
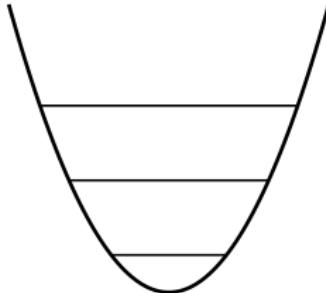
- Calculate binding energy
- Refine Feshbach resonance prediction



# Interaction shift

## Goal

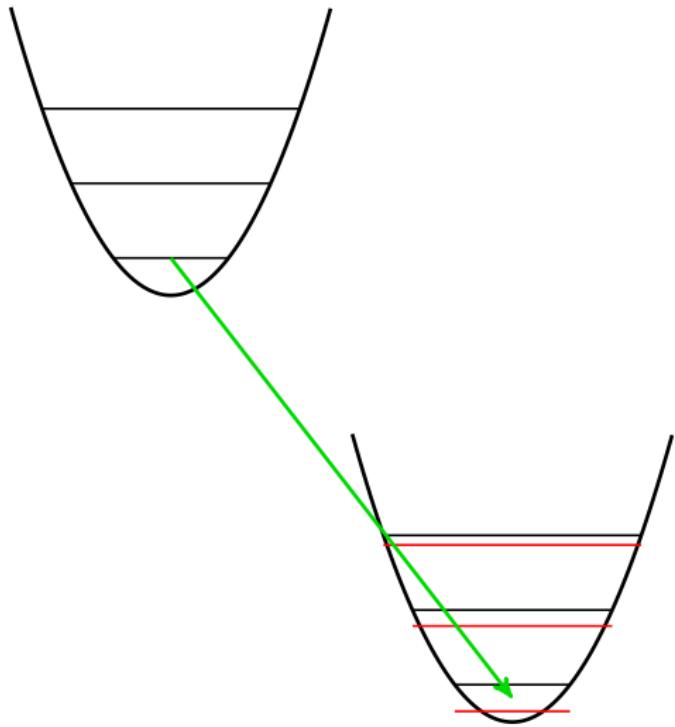
- Calculate binding energy
- Refine Feshbach resonance prediction



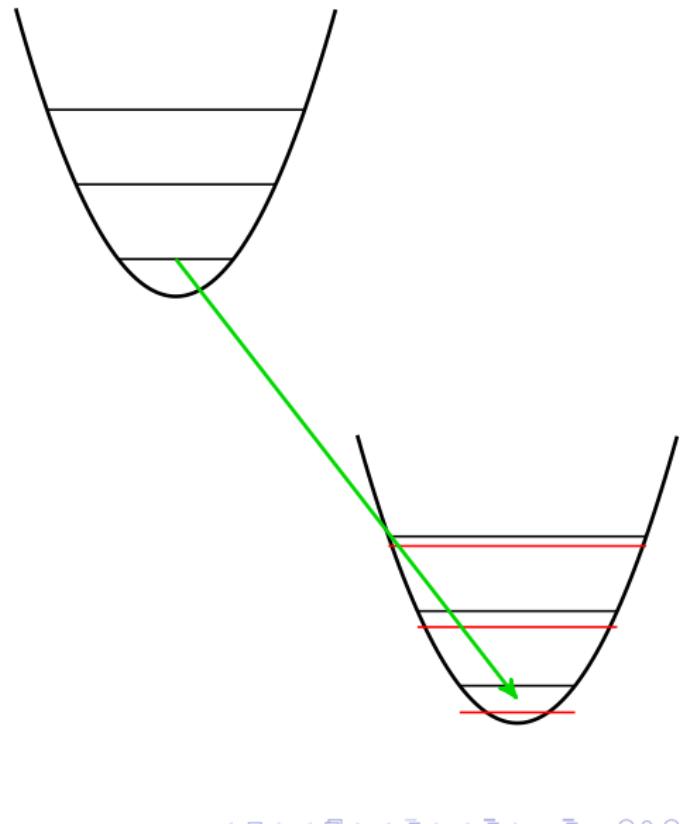
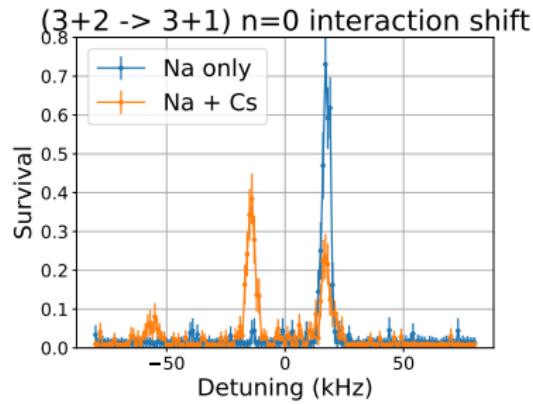
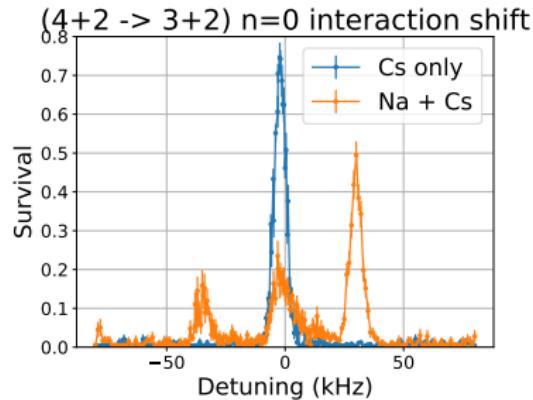
# Interaction shift

## Goal

- Calculate binding energy
- Refine Feshbach resonance prediction

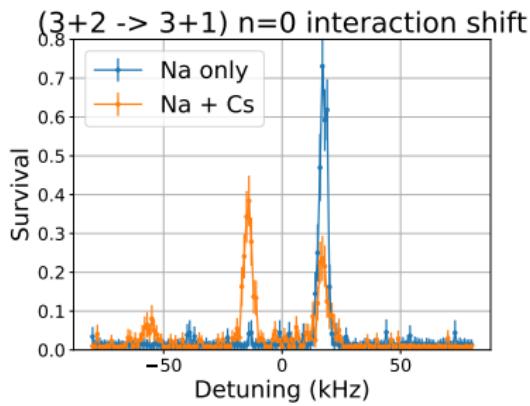
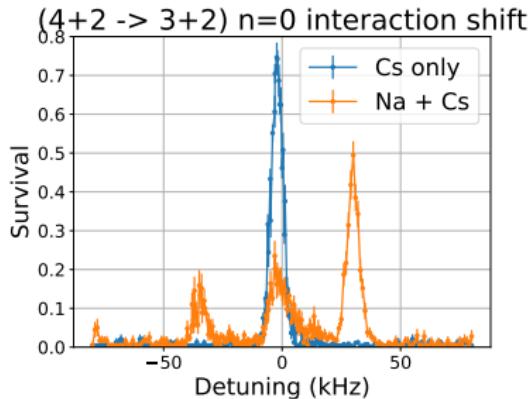


# Interaction shift



## Interaction shift

## Shift $\leftrightarrow$ Scattering length

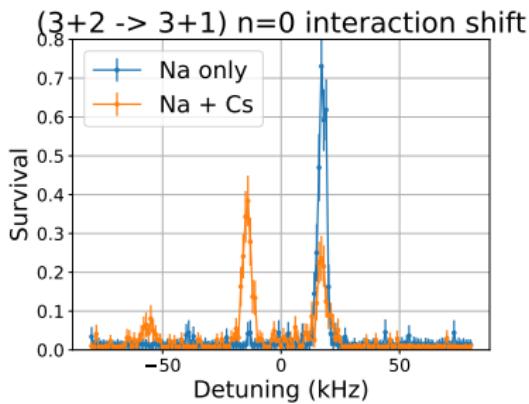
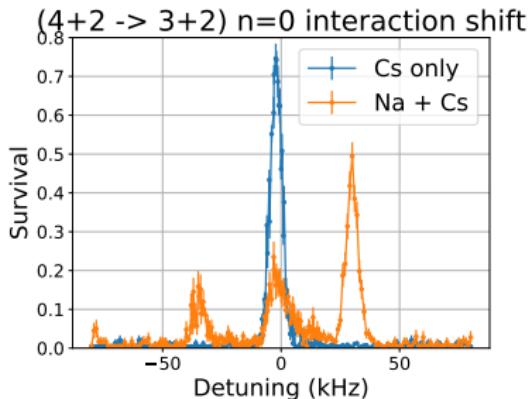


- First order perturbation

$$\delta E \propto a$$

- Full diagonalization

## Interaction shift



## Shift $\leftrightarrow$ Scattering length

- First order perturbation

$$\delta E \propto a$$

- Full diagonalization

