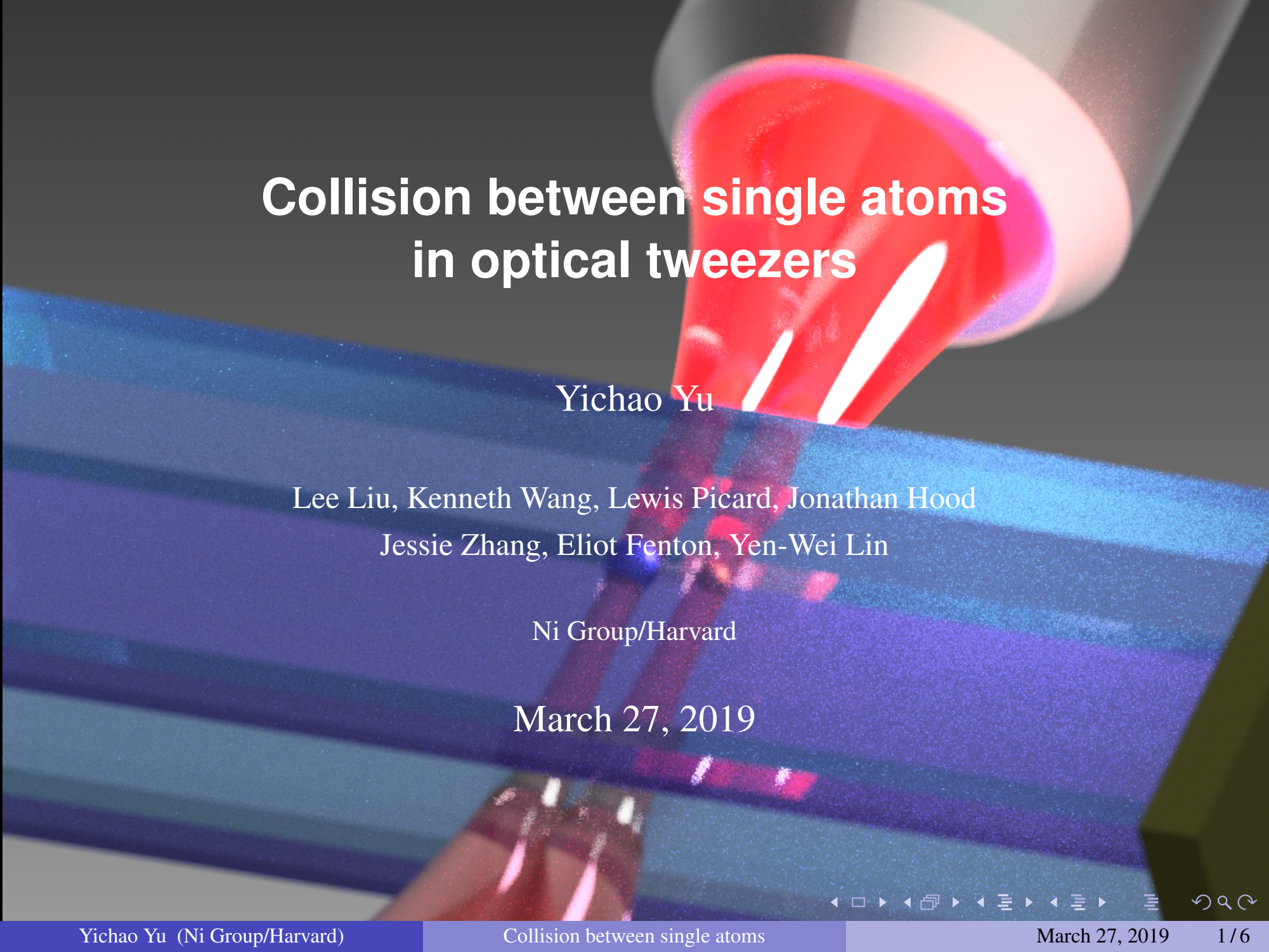


Collision between single atoms in optical tweezers

Yichao Yu

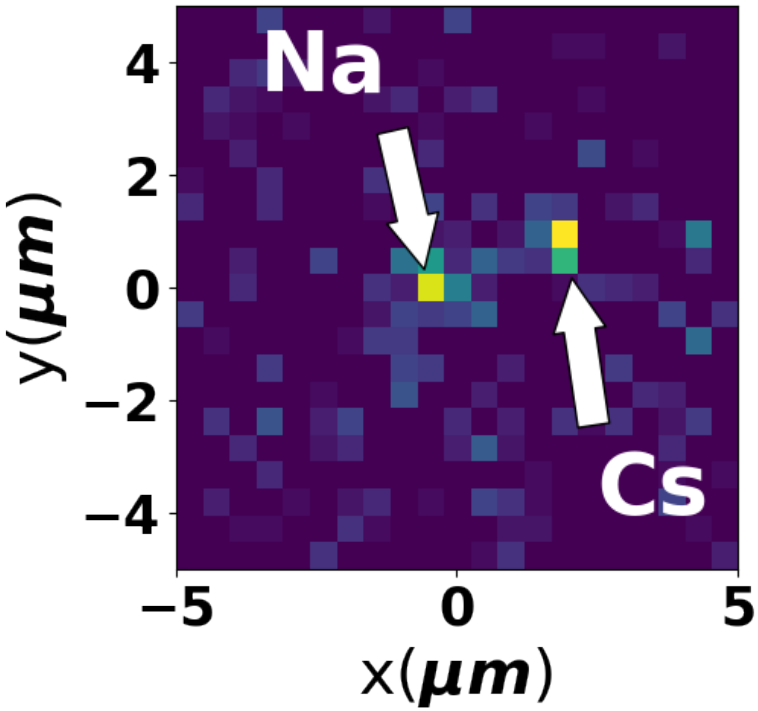
Lee Liu, Kenneth Wang, Lewis Picard, Jonathan Hood

Jessie Zhang, Eliot Fenton, Yen-Wei Lin

Ni Group/Harvard

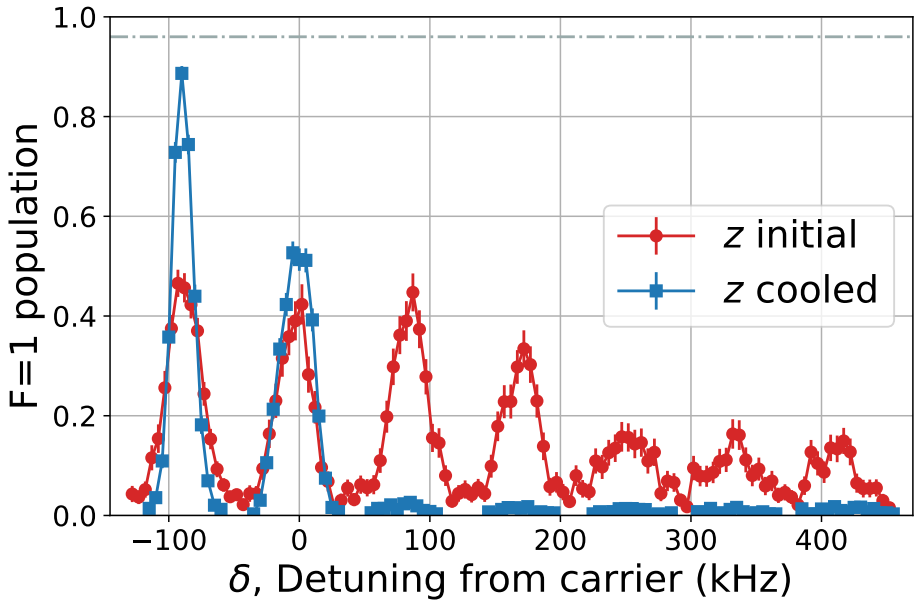
March 27, 2019

Loading



Loading probability per site: 60%
Post select on initial and final state.

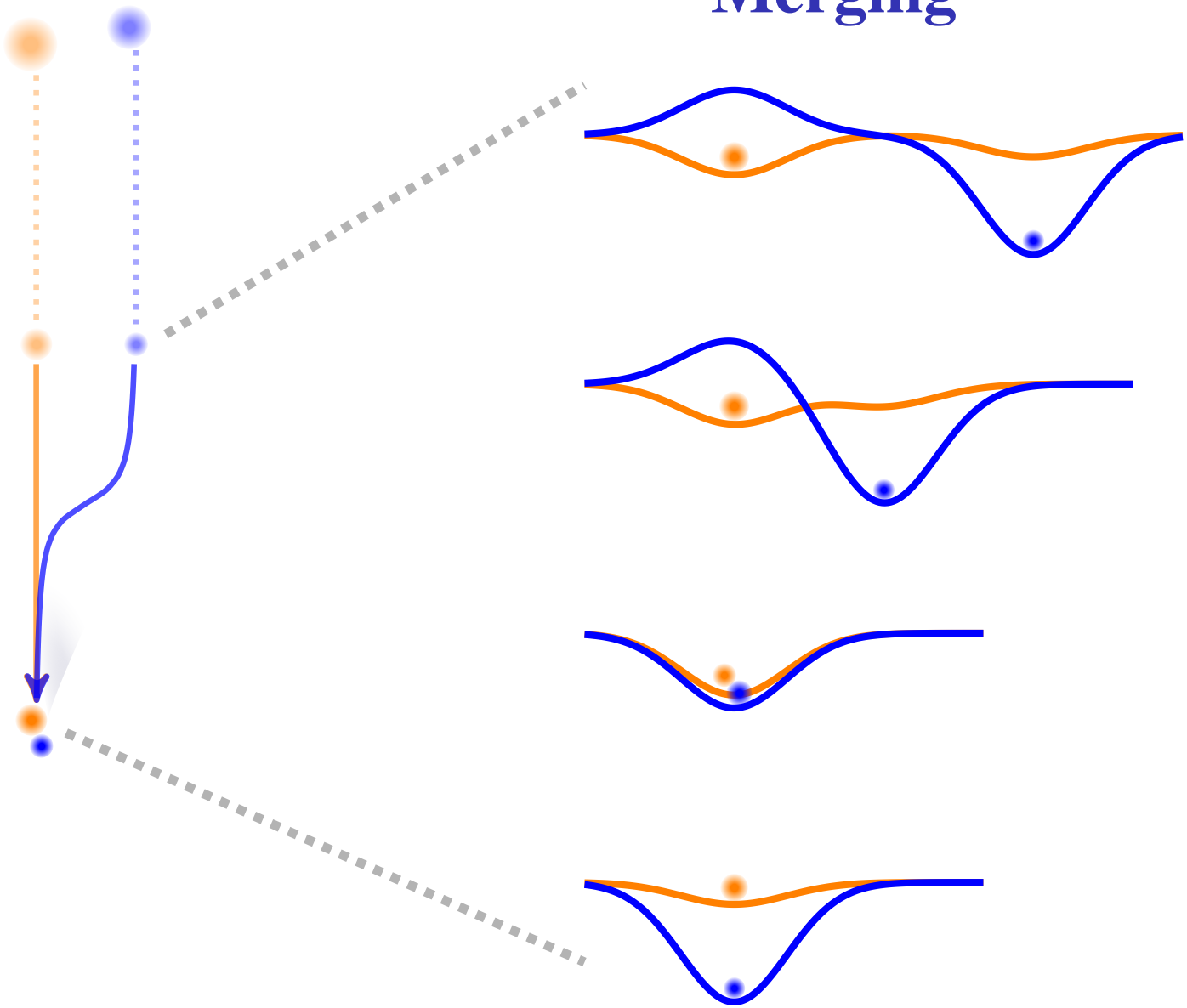
Cooling



Cs: 96% ground state

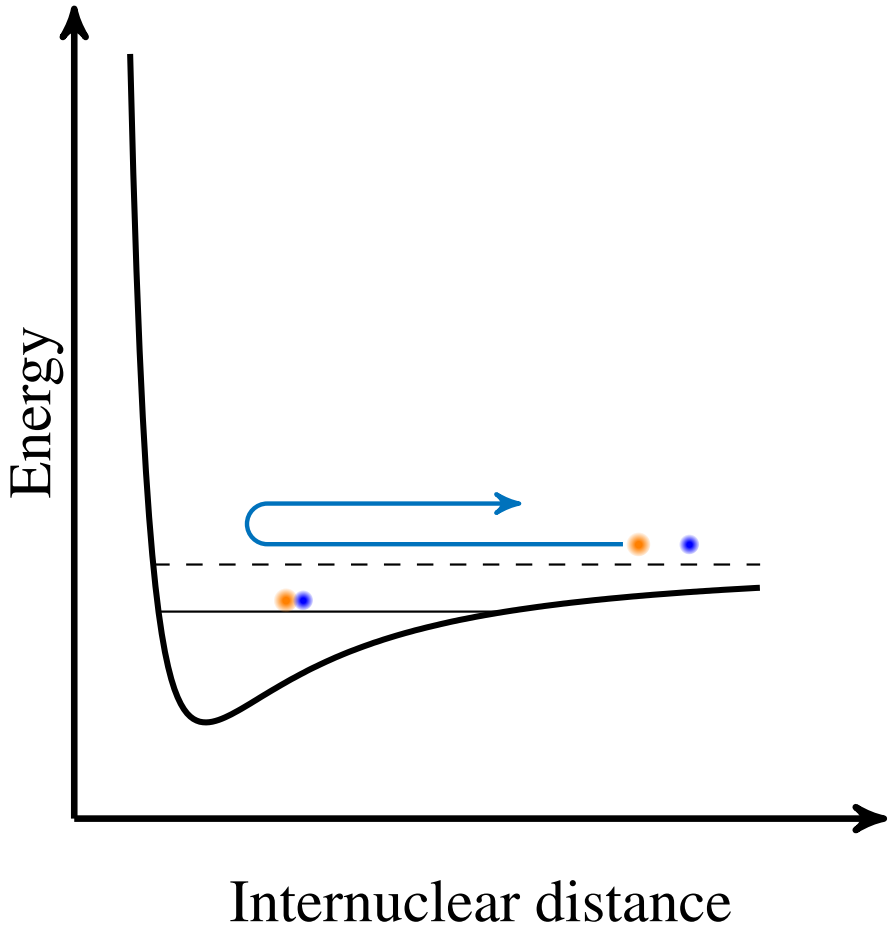
Na: 94% ground state

Merging



Scattering length a

- Binding energy
- Molecular potential
- Feshbach resonance
- Molecule formation
- ⋮



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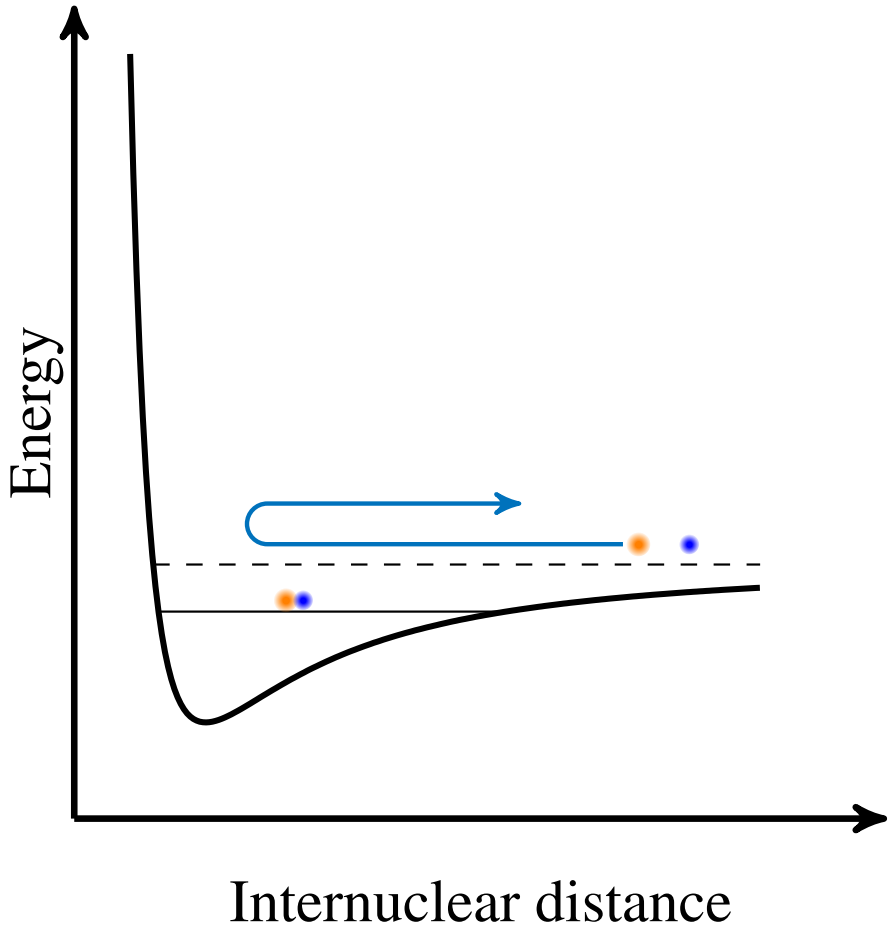

Scattering length a

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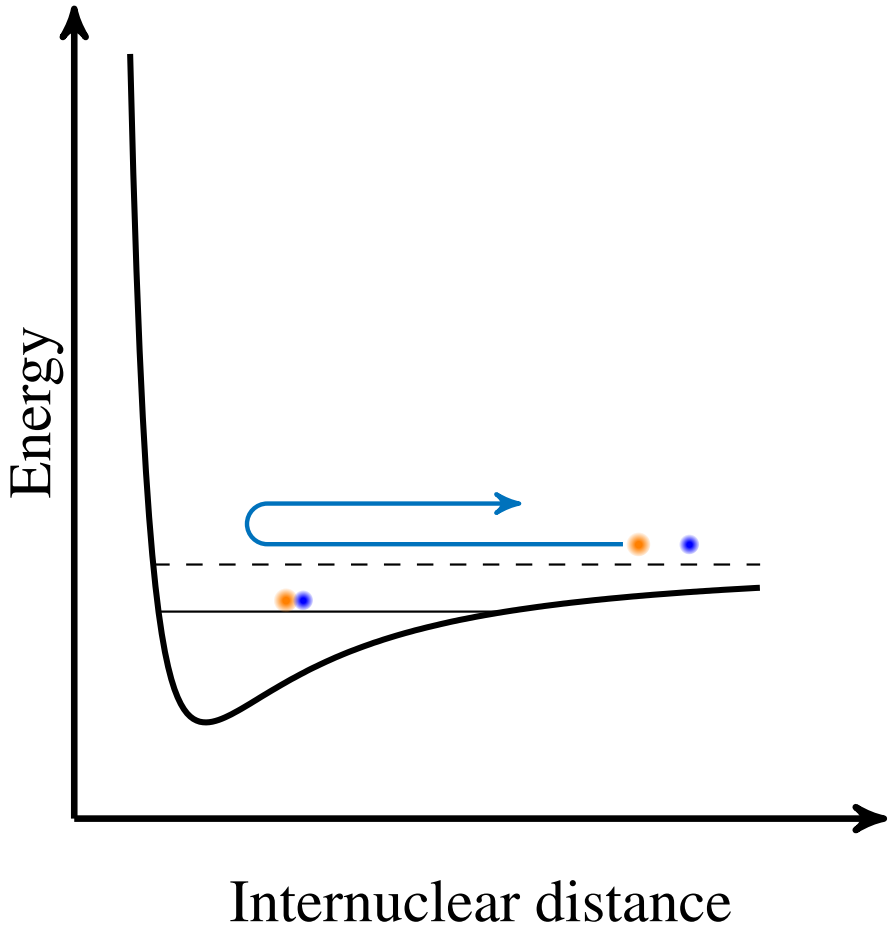

Scattering length a

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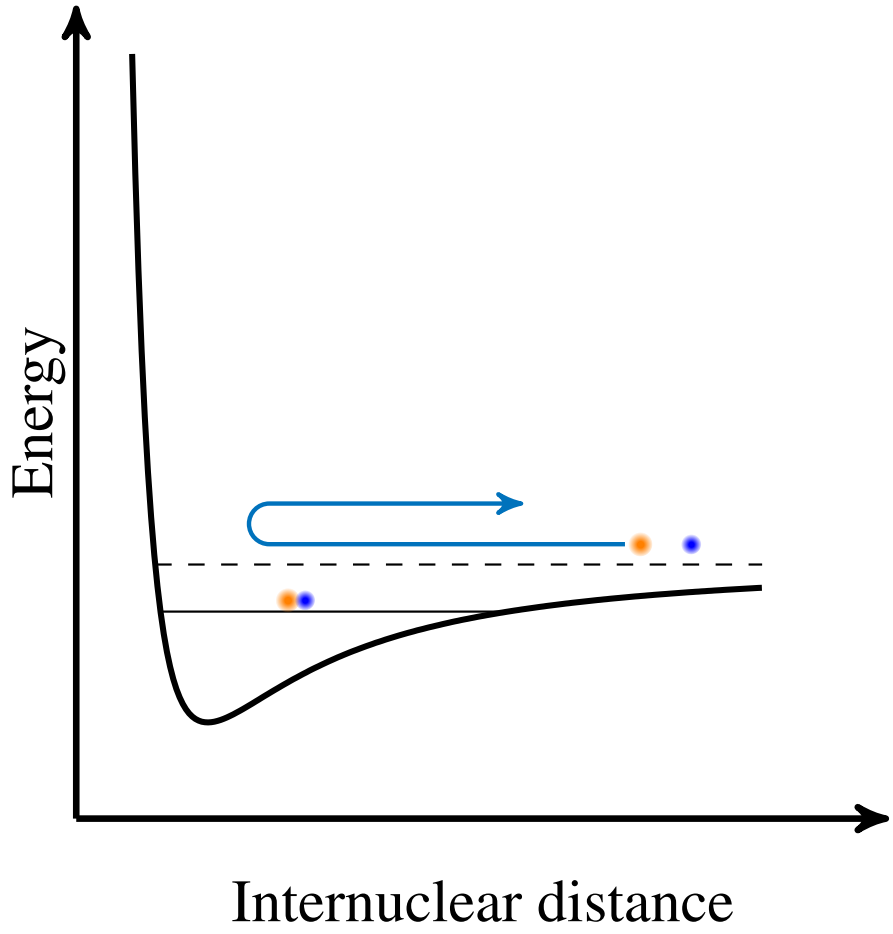

Scattering length a

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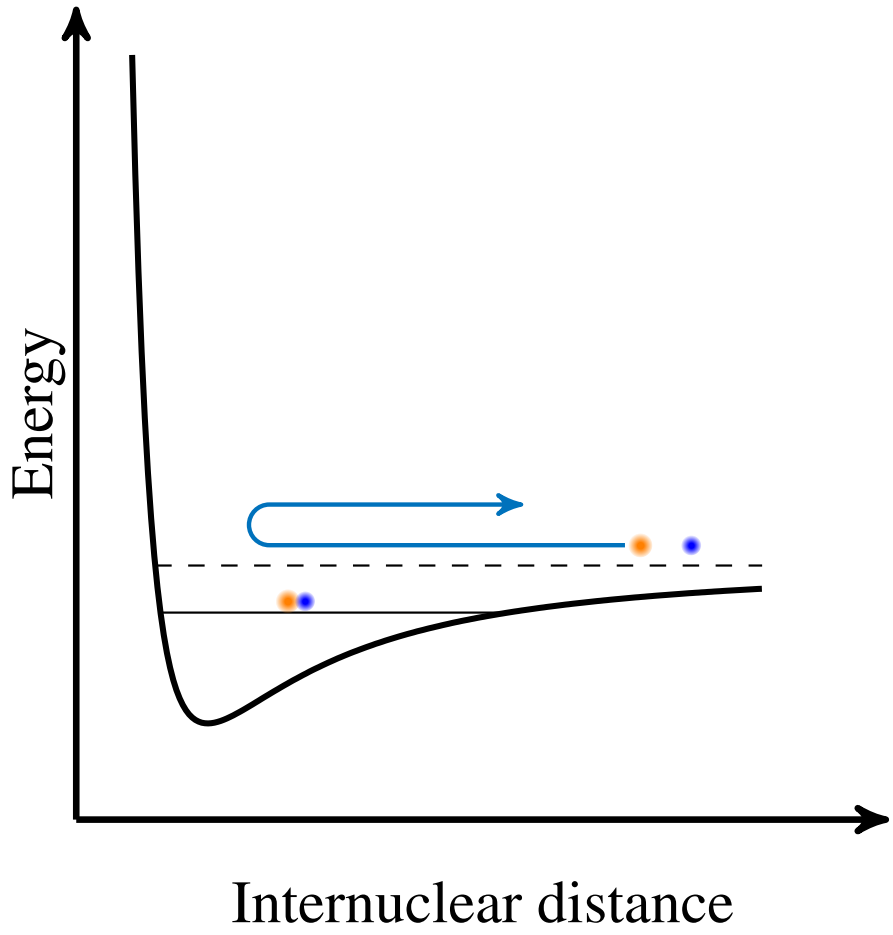
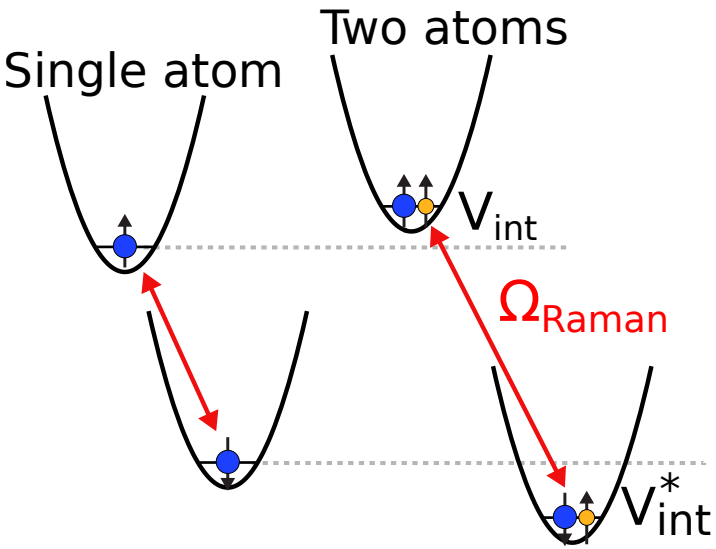
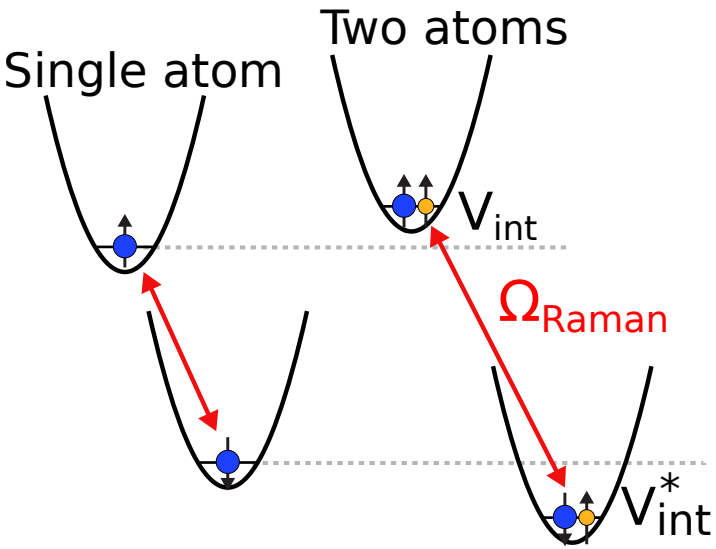
⋮

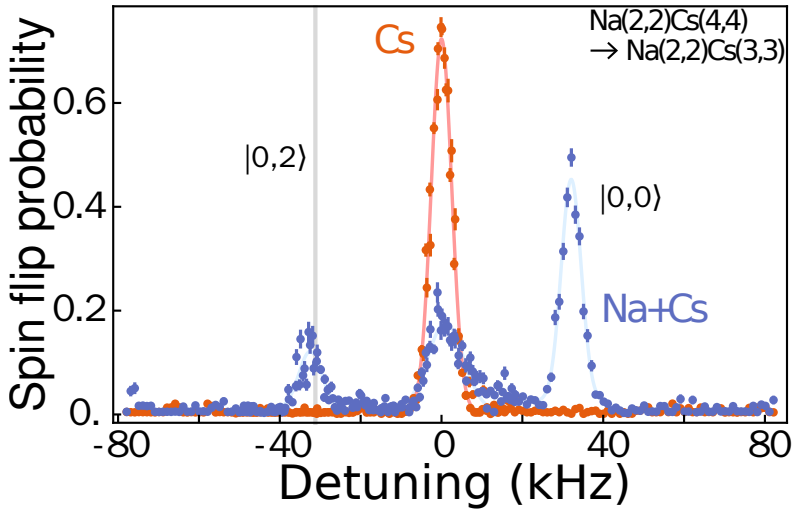


Interaction shift

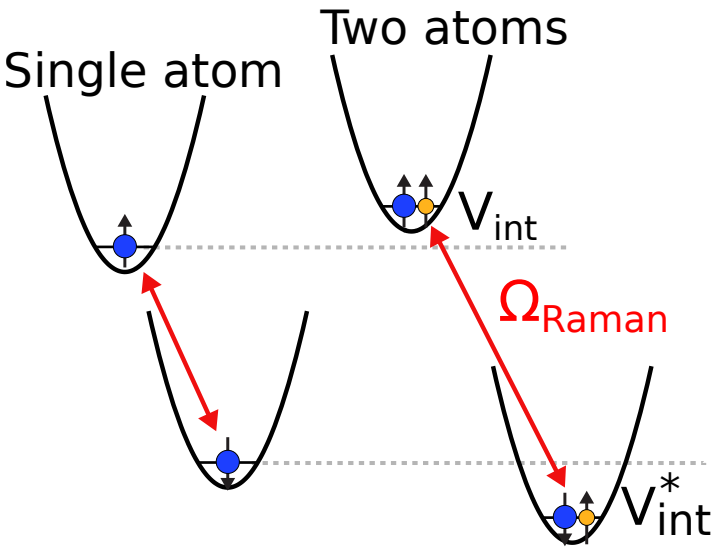


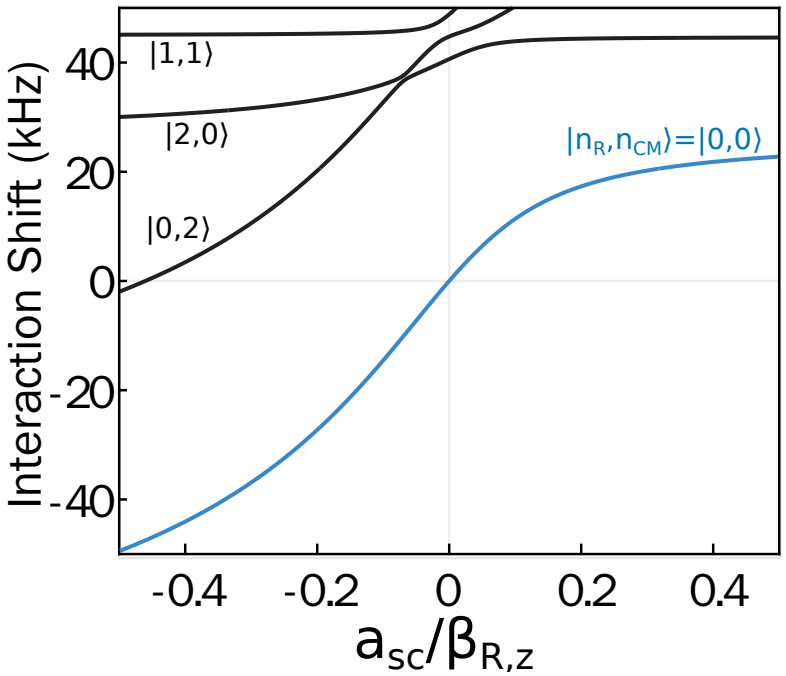
Interaction shift

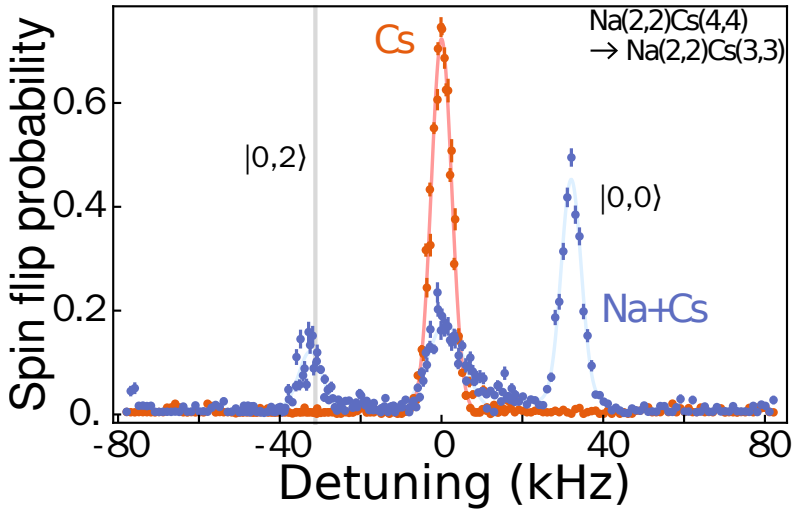




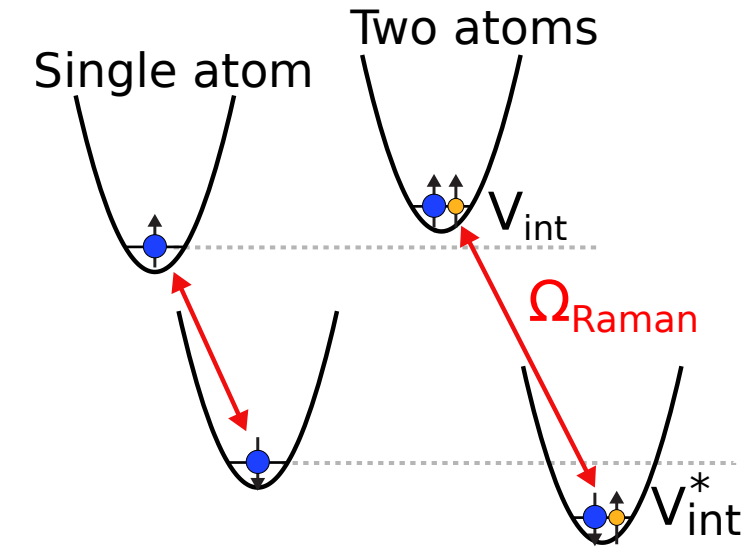
Interaction shift

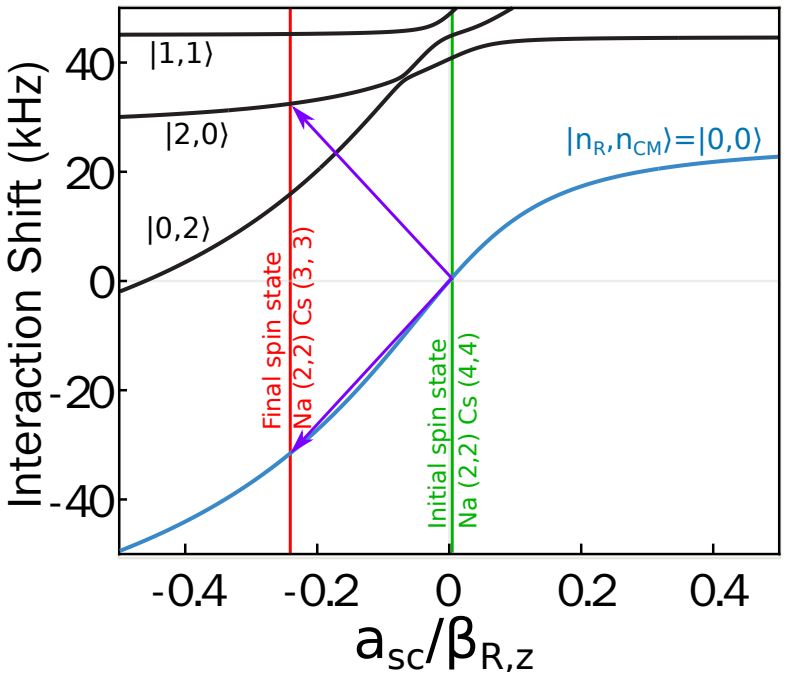


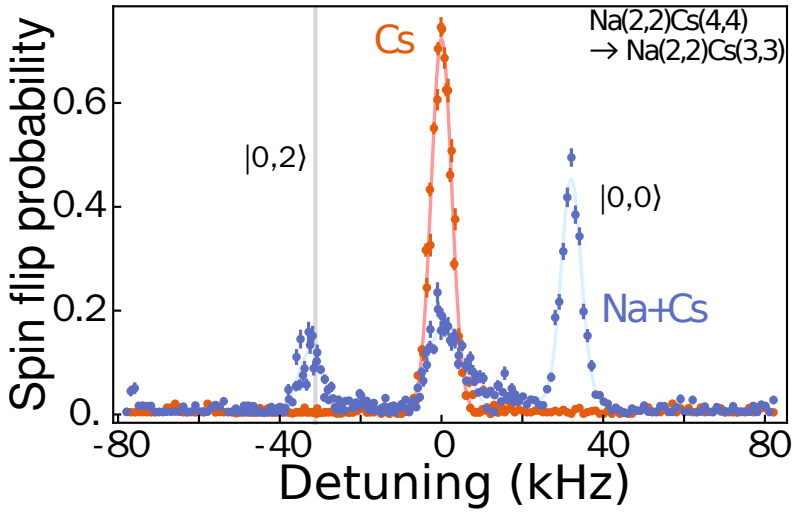




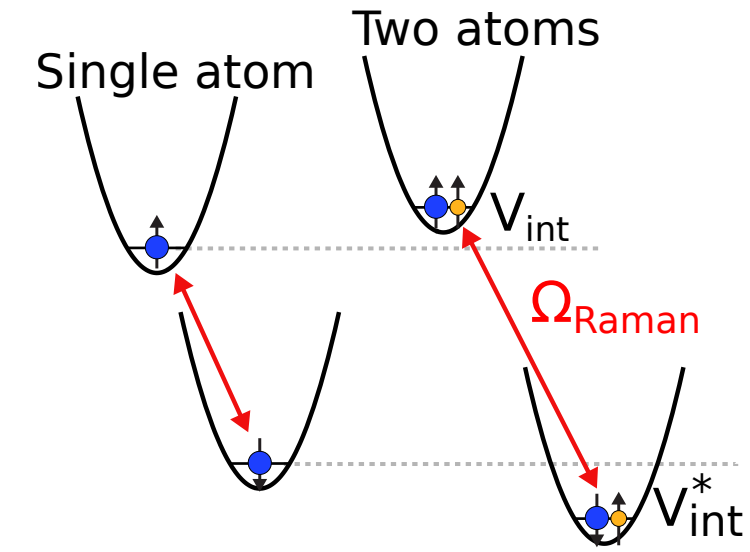
Interaction shift

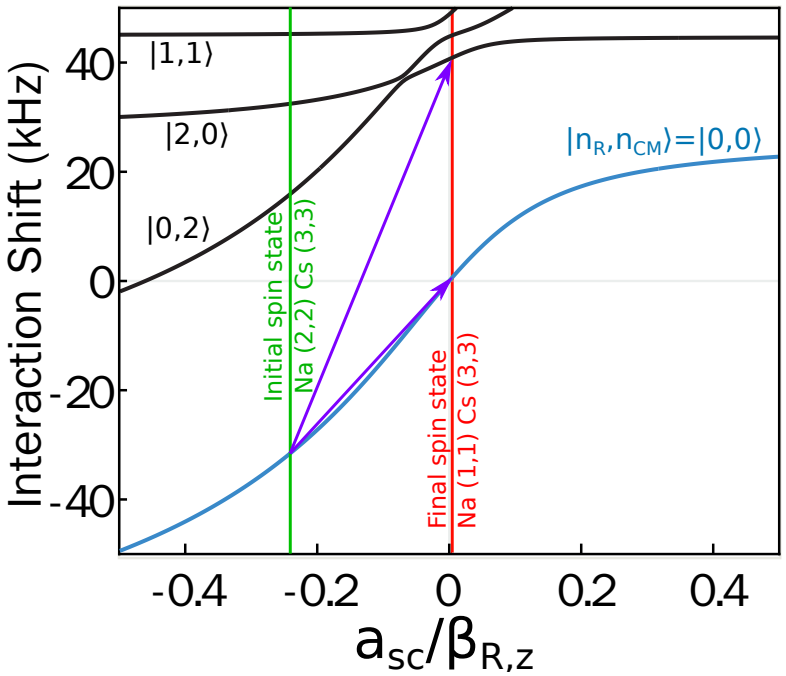


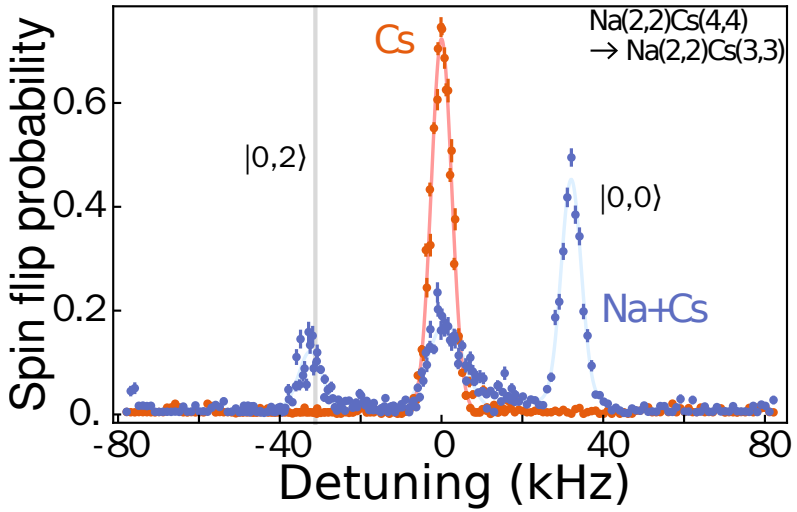


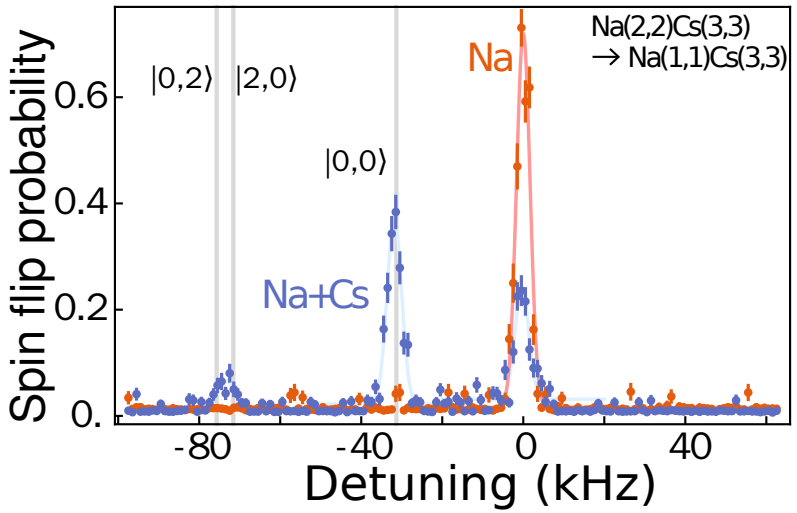


Interaction shift









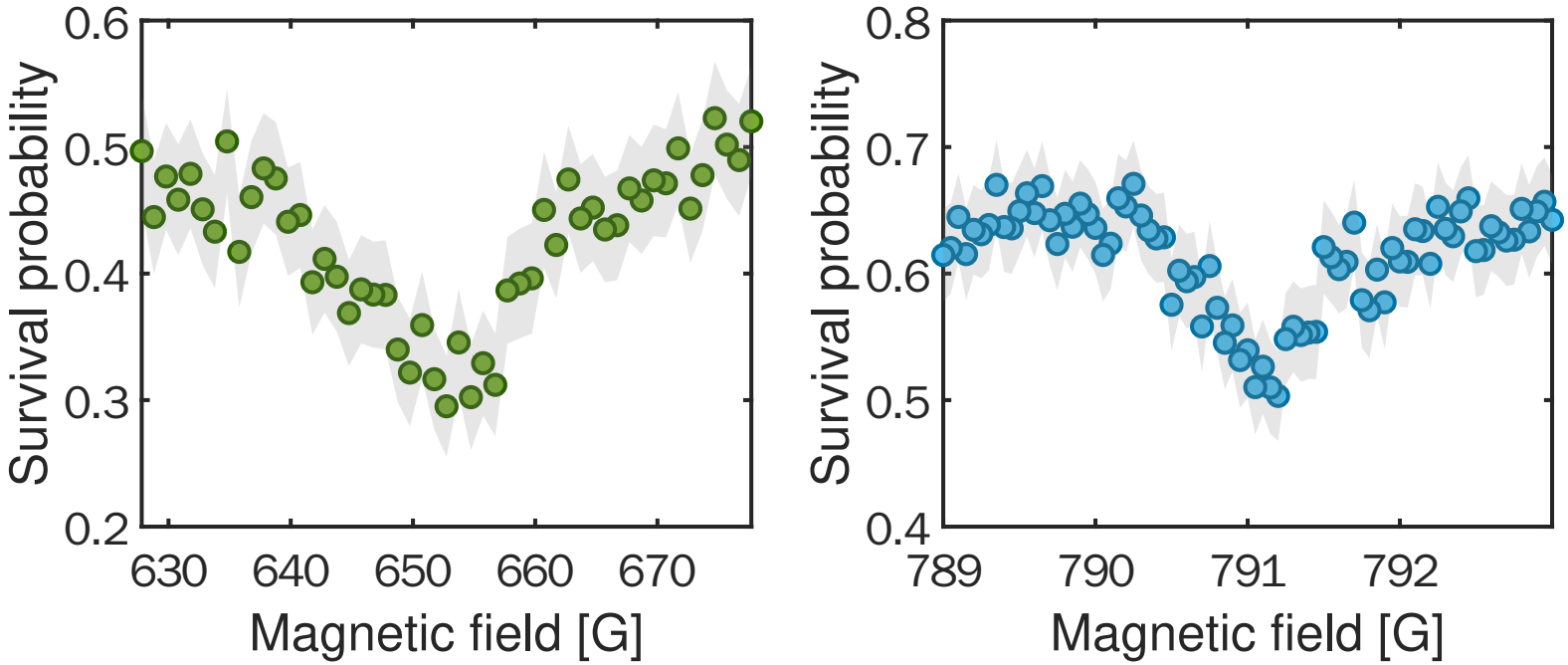
Na (1, -1) Cs (3, -3) Feshbach resonance

	s-wave	*p*-wave
Predicted (based on interaction shift)[1]	663 G	799 G

[1] In collaboration with Bo Gao

Na (1, -1) Cs (3, -3) Feshbach resonance

	s-wave	*p*-wave
Predicted (based on interaction shift)[1]	663 G	799 G
Measured	652(3) G	791.2(2) G



[1] In collaboration with Bo Gao

Next step

- Make Feshbach molecules
- Take advantage of the large scattering length to enhance molecule formation

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Thank you for your attention.