

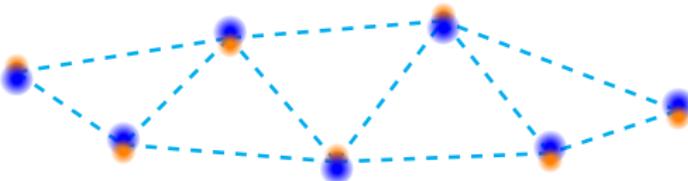
Manipulating single NaCs in optical tweezers

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Ni Group/Harvard

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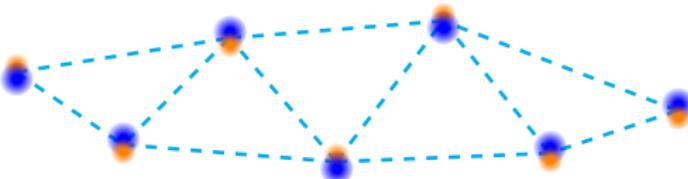


Optical tweezer

- Single site detection
- Single site control
- Flexible geometry

NaCs molecule

- Strong dipole interaction
Dipole moment: 4.6 Debye
- Made from alkali atoms

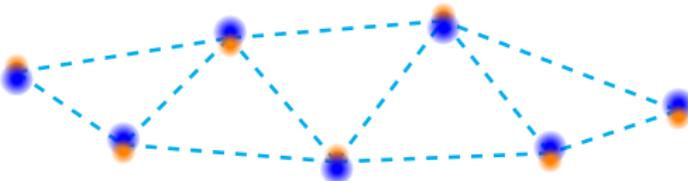


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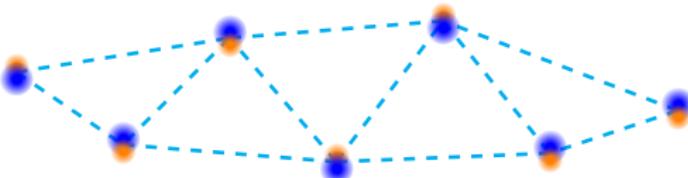


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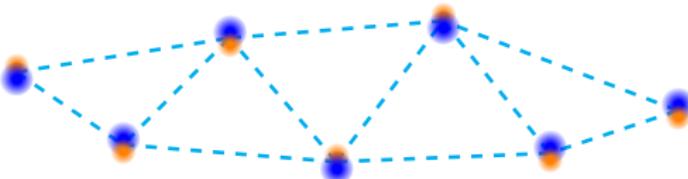


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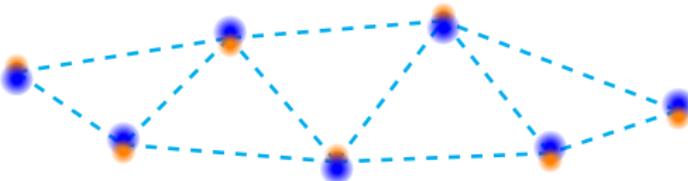


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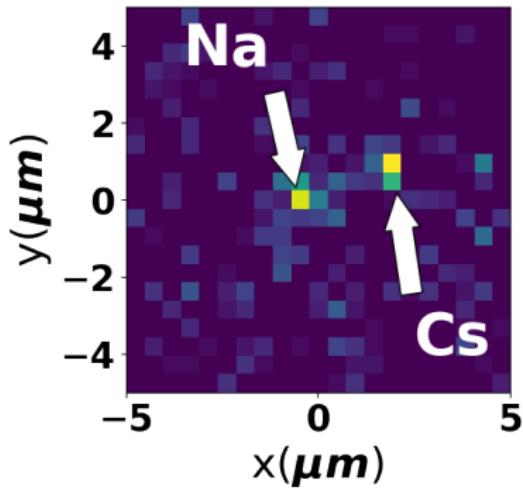
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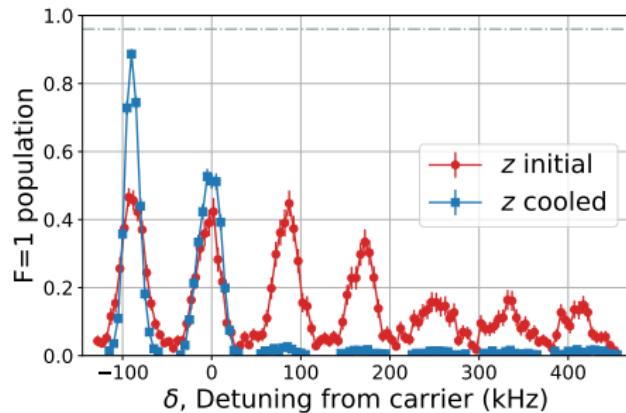
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Loading



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

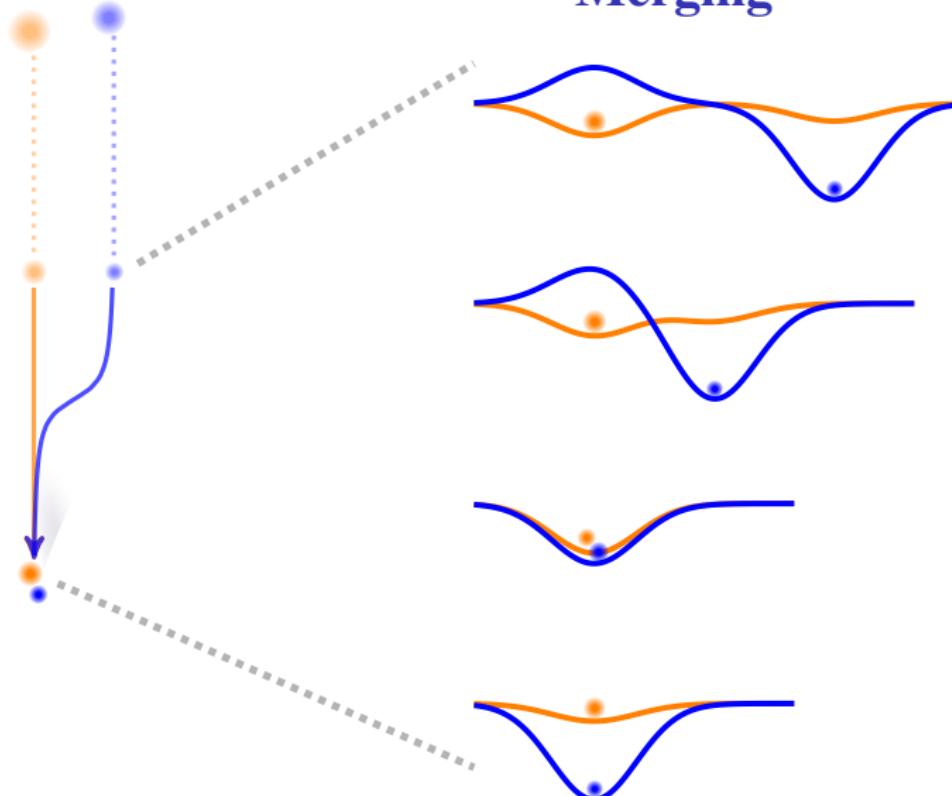
Cooling



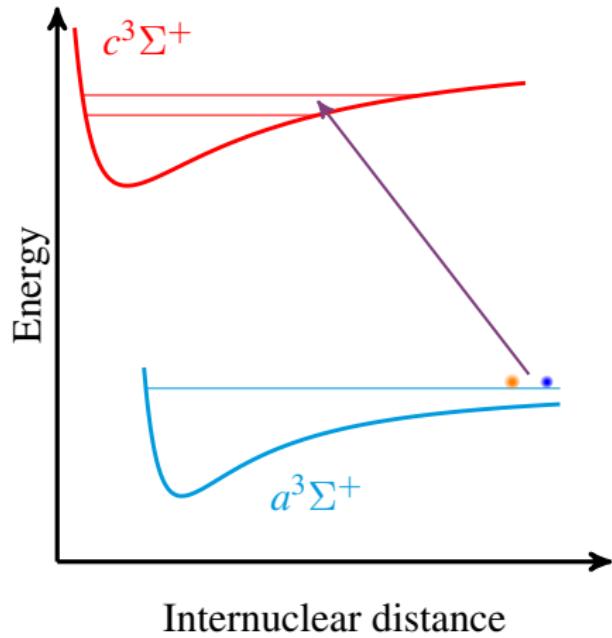
Cs: 96% ground state

Na: 94% ground state

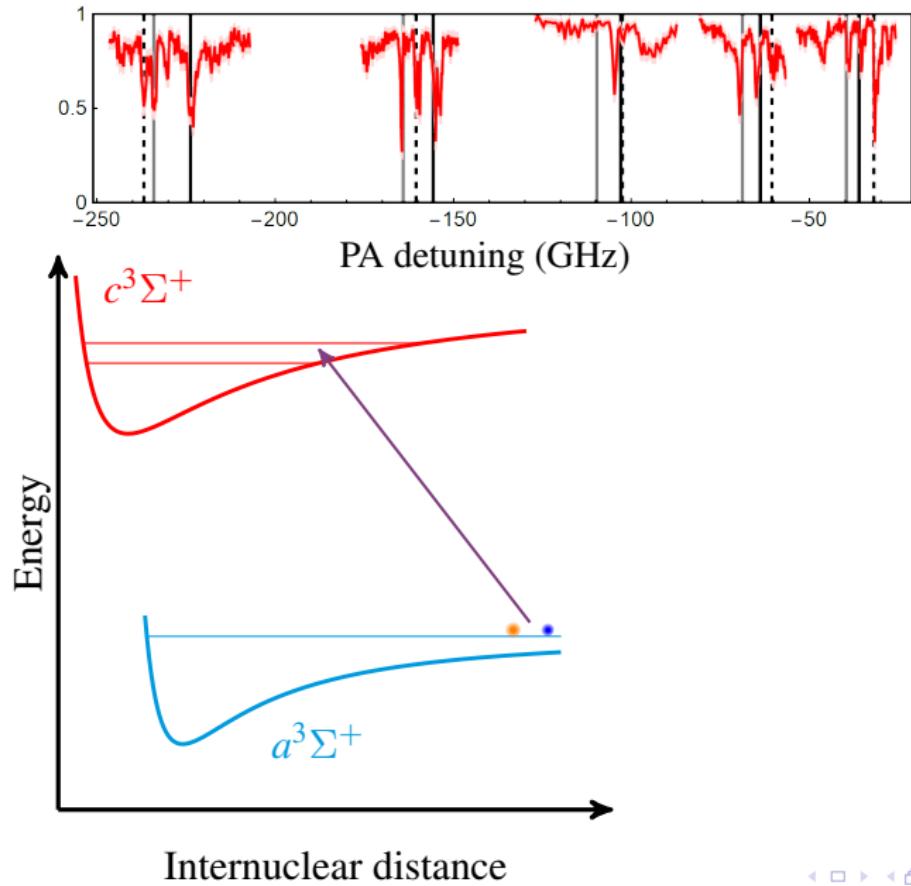
Merging



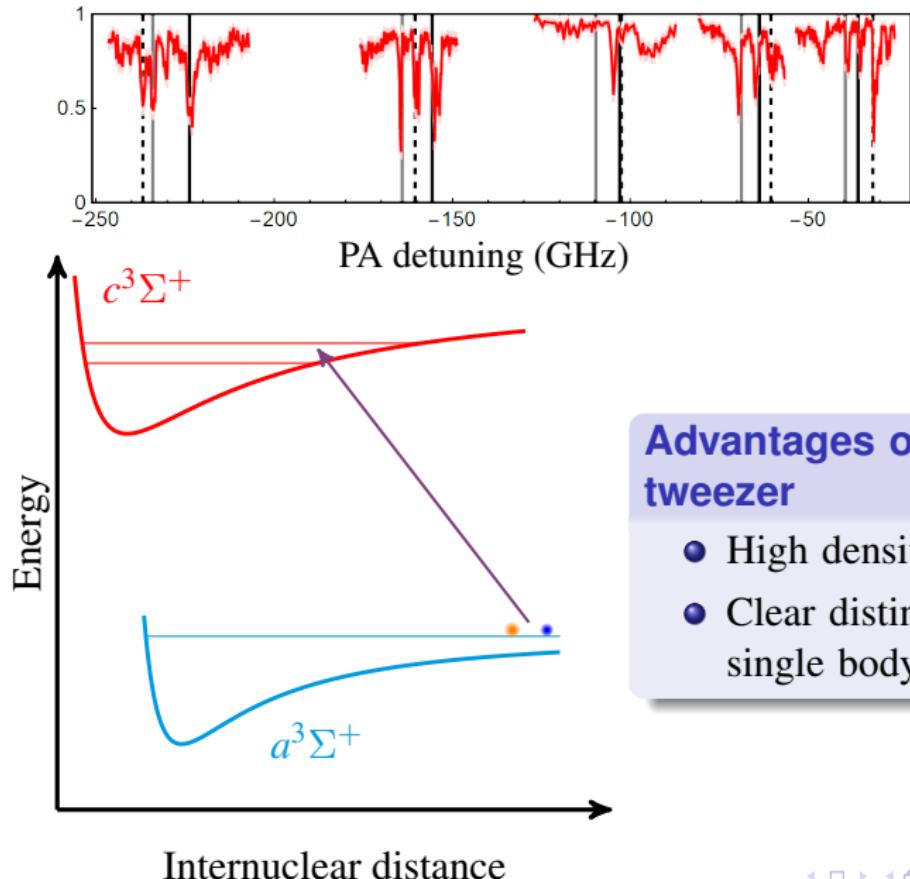
Photoassociation (PA)



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Advantages of optical tweezer

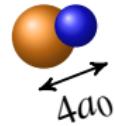
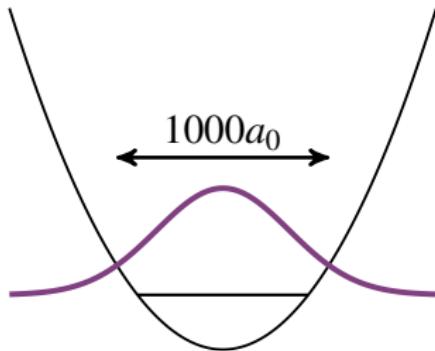
- High density
- Clear distinction from single body loss

Getting to ground state

- Full control of internal state
- Stronger interaction

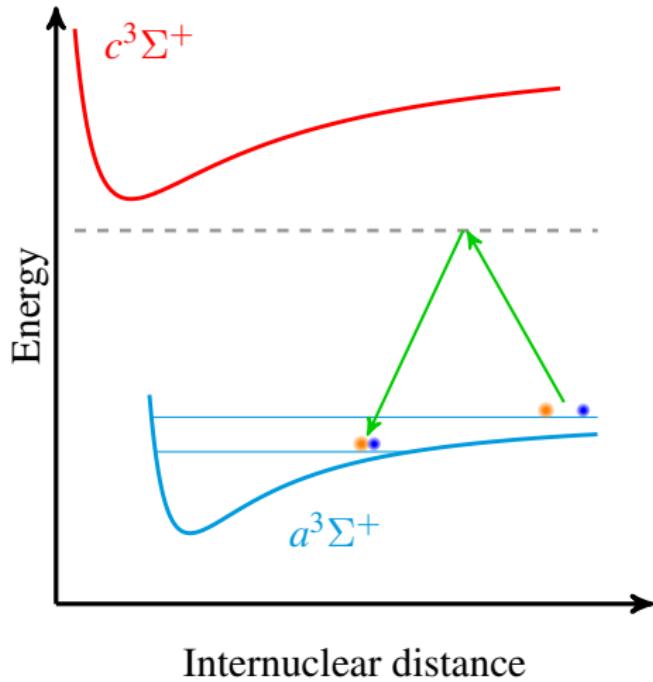
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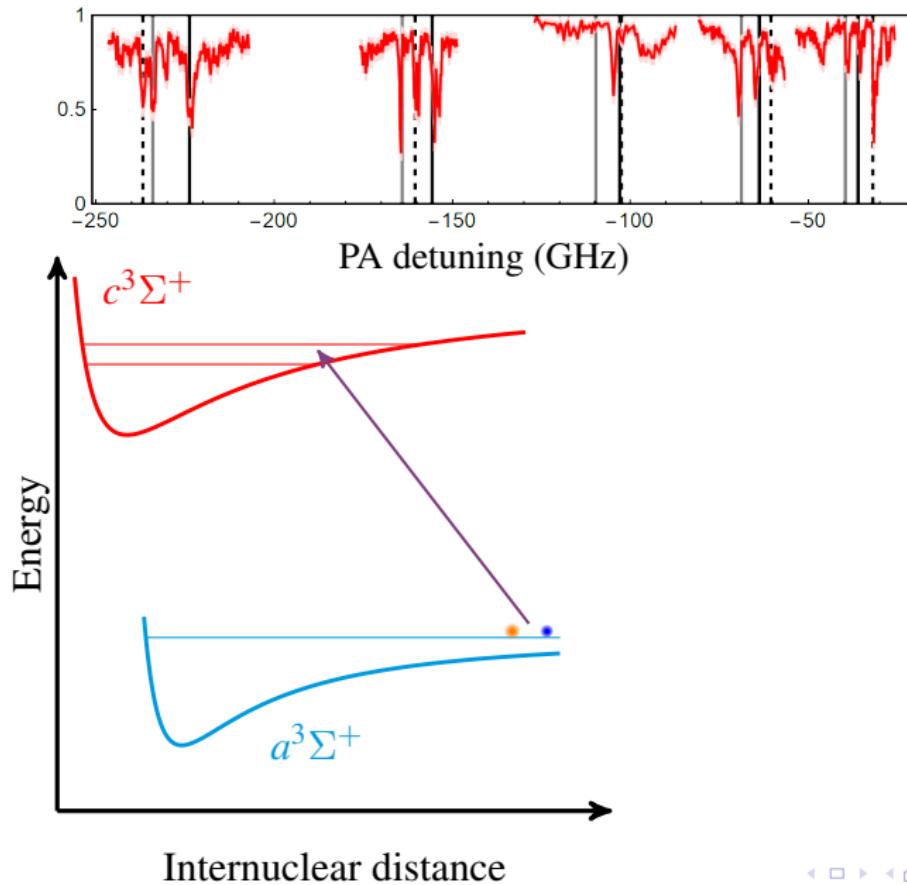


Getting to ground state

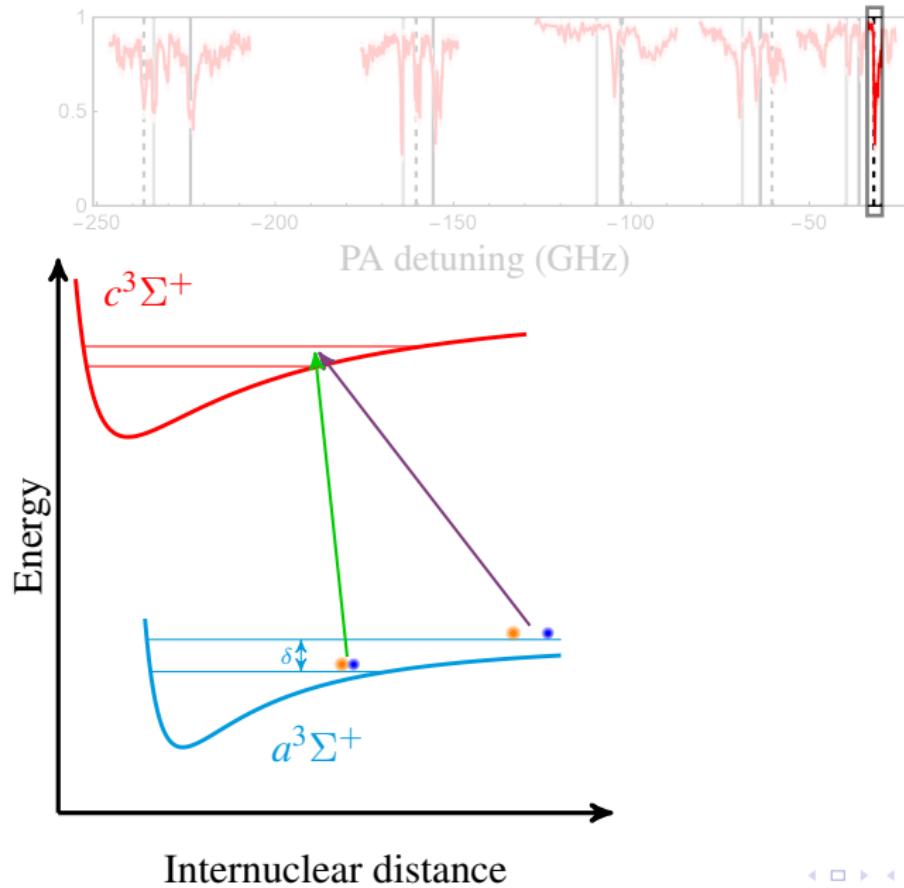
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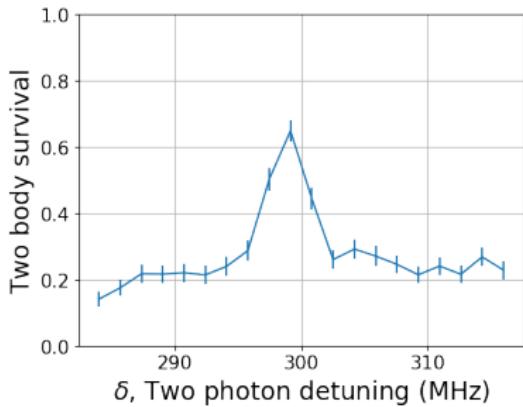
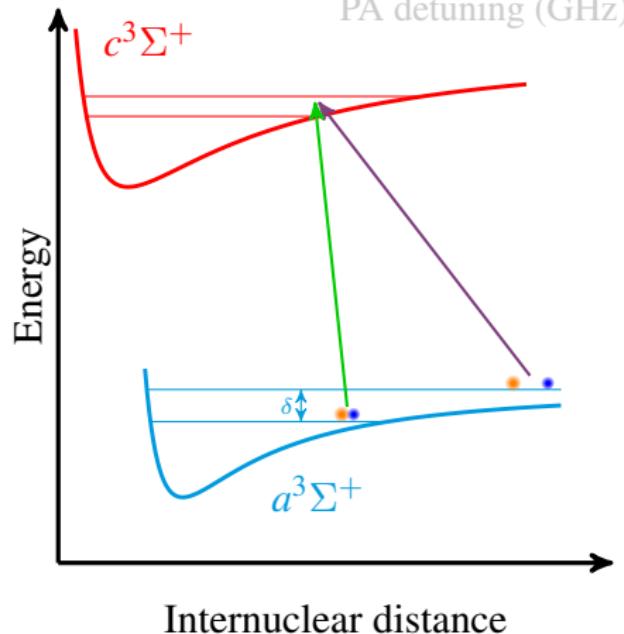
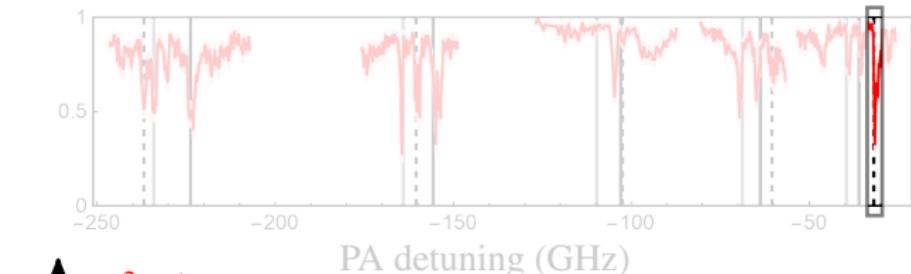
Photoassociation (PA)



Electromagnetically Induced Transparency (EIT) spectroscopy



Electromagnetically Induced Transparency (EIT) spectroscopy



Next step

Make ground state molecules!!

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Make ground state molecules!!

Thank you for your attention.

