Association of single ultracold molecules in optical tweezers

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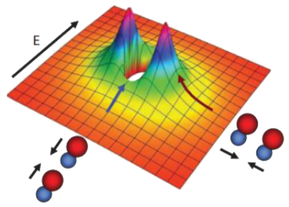
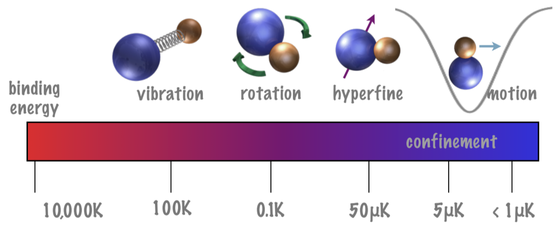
Ultracold Molecules

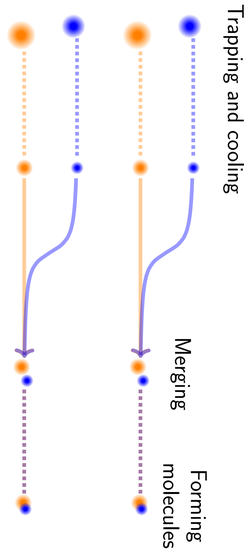
- NaCs has a large permanent electric dipole moment (4.6 **Debye**)
- Strong anisotropic dipole-dipole interactions
- Coupled internal degrees of freedom can be used to tune interactions and store information





Our approach

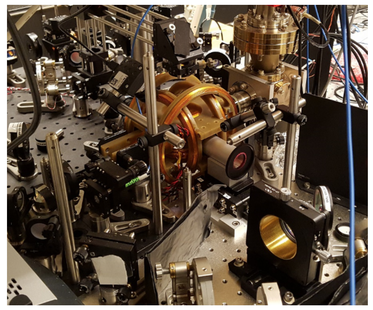
- Assemble and trap individual molecules in optical tweezers from laser-cooled atoms
- Raman transition from atoms to weakly-bound molecules
- STIRAP to ground state molecules



Advantages

- Fast cycle time (<1s), small vacuum chamber
- Dynamically configurable trapping geometry
- All optical cooling and state-manipulation

Trapping and cooling of atoms



Vieta's Formulas- Task

1. Prove that

$$x_1 x_2 = \frac{c}{a}$$

Glossary

verb	noun	meaning
add	addition	$+$
subtract	subtraction	$-$
multiply	multiplication	$\cdot$
divide	division	$\div$
solve	solution	getting answer
substitute	substitution	$t = x^2$

Table: Word Formation

Some Necessary and Useful Vocabulary

- (n.) sign $\rightarrow +$ or $-$
- (n.) equation $\rightarrow something = 0$
- (n.) factor $\rightarrow$ two multiplied factors give result
- (v.) factorise $\rightarrow$ putting into brackets
- (n.) coefficient $\rightarrow$ a constant number i.e. a, b, c in a pattern $ax^2 + bx + c$
- (n.) quadratic function $\rightarrow f(x) = ax^2 + bx + c$
- (n.) root $\rightarrow \sqrt{sth}$ or solution of quadratic equation
- (n.) formula $=$ pattern

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