

# Laser Dipole traps

## Quasi-static Limit:

- 1 W of power.
- focused down to 100  $\mu\text{m}$ .

# Laser Dipole traps

## Quasi-static Limit:

- 1 W of power.
- focused down to 100  $\mu\text{m}$ .

Atom:  $^{87}\text{Rb}$

DC polarizability:  $\alpha = h \cdot 0.08 \text{ Hz} / \left(\frac{\text{V}}{\text{cm}}\right)^2$

# Laser Dipole traps

## Quasi-static Limit:

- 1 W of power.
- focused down to 100  $\mu\text{m}$ .

Atom:  $^{87}\text{Rb}$

DC polarizability:  $\alpha = h \cdot 0.08 \text{ Hz} / \left(\frac{\text{V}}{\text{cm}}\right)^2$

$\Rightarrow$  Intensity  $\sim 10^8 \text{ W/m}^2$ , Electric field  $\sim 3 \times 10^3 \text{ V/cm}$

# Laser Dipole traps

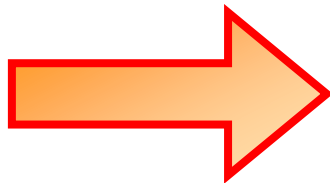
## Quasi-static Limit:

- 1 W of power.
- focused down to 100  $\mu\text{m}$ .

Atom:  $^{87}\text{Rb}$

DC polarizability:  $\alpha = h \cdot 0.08 \text{ Hz}/\left(\frac{\text{V}}{\text{cm}}\right)^2$

$\Rightarrow$  Intensity  $\sim 10^8 \text{ W/m}^2$ , Electric field  $\sim 3 \times 10^3 \text{ V/cm}$



$$U = -2.5 \times 10^{-28} \text{ J}$$

$$\sim 20 \mu\text{K} !!!$$

$$\Rightarrow v \sim 4 \text{ cm/s}$$

# Laser Dipole traps

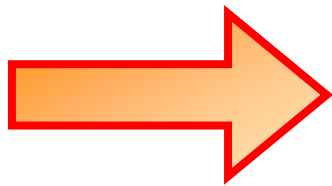
## Quasi-static Limit:

- 1 W of power.
- focused down to 100  $\mu\text{m}$ .

Atom:  $^{87}\text{Rb}$

DC polarizability:  $\alpha = h \cdot 0.08 \text{ Hz} / \left(\frac{\text{V}}{\text{cm}}\right)^2$

$\Rightarrow$  Intensity  $\sim 10^8 \text{ W/m}^2$ , Electric field  $\sim 3 \times 10^3 \text{ V/cm}$

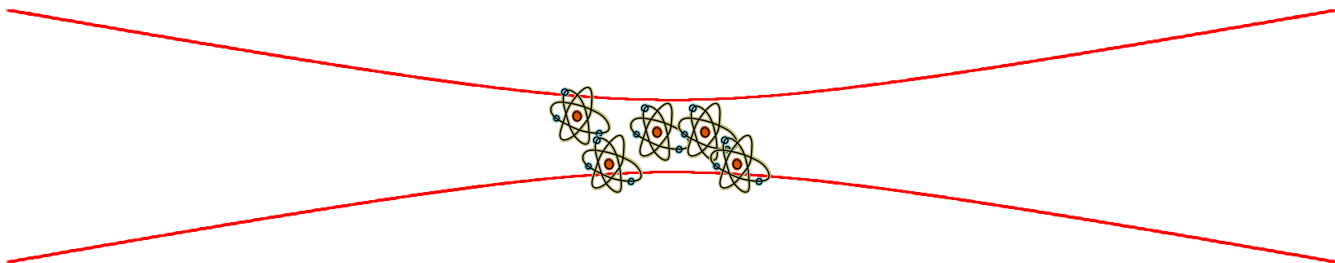


$$U = -2.5 \times 10^{-28} \text{ J}$$

$$\sim 20 \mu\text{K} !!!$$

$$\Rightarrow v \sim 4 \text{ cm/s}$$

Ultracold atoms are trapped by focused laser light !!!



# Laser Dipole traps

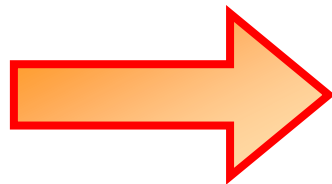
## Quasi-static Limit:

- 1 W of power.
- focused down to 100  $\mu\text{m}$ .

Atom:  $^{87}\text{Rb}$

DC polarizability:  $\alpha = h \cdot 0.08 \text{ Hz} / \left(\frac{\text{V}}{\text{cm}}\right)^2$

$\Rightarrow$  Intensity  $\sim 10^8 \text{ W/m}^2$ , Electric field  $\sim 3 \times 10^3 \text{ V/cm}$



$$U = -2.5 \times 10^{-28} \text{ J}$$

$$\sim 20 \mu\text{K} !!!$$

$$\Rightarrow v \sim 4 \text{ cm/s}$$

Ultracold atoms are trapped by focused laser light !!!

