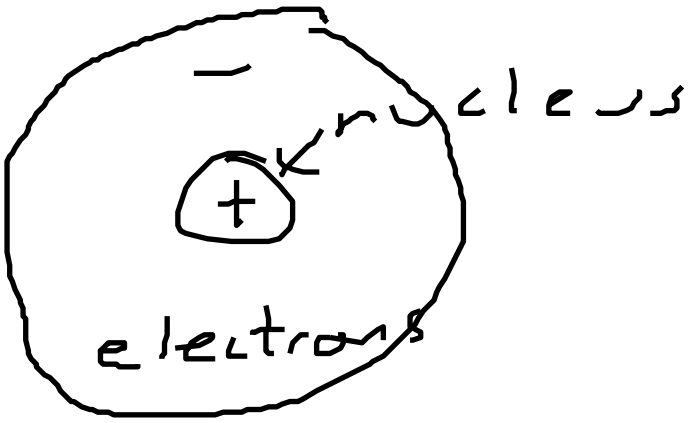
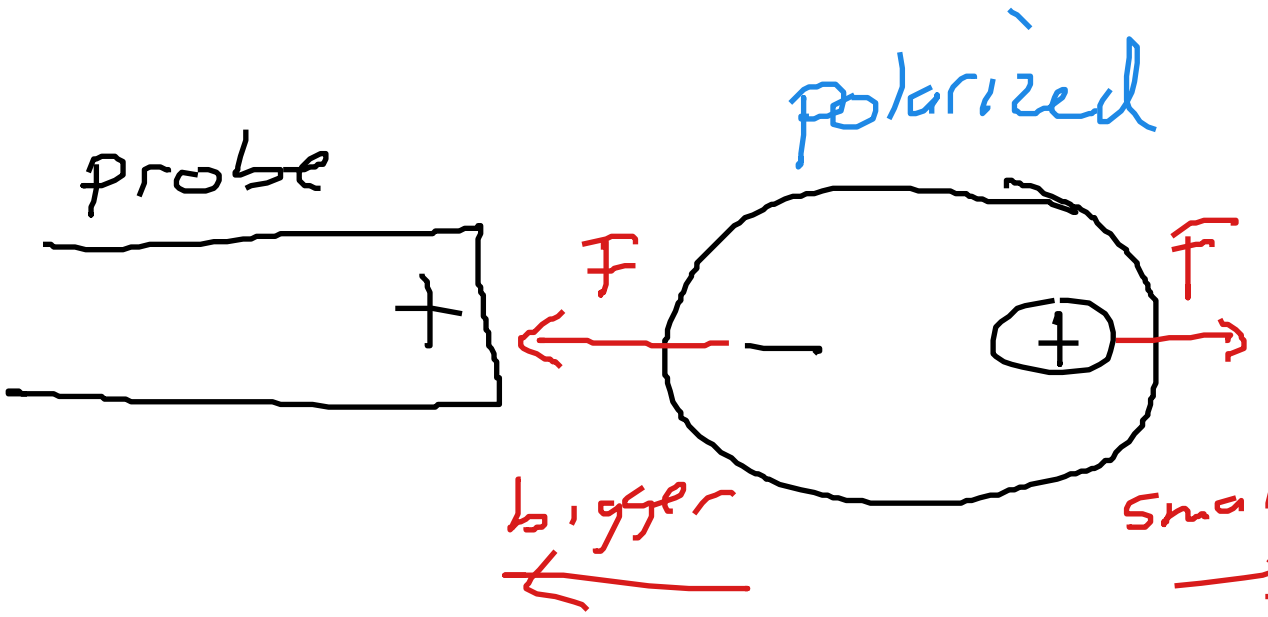
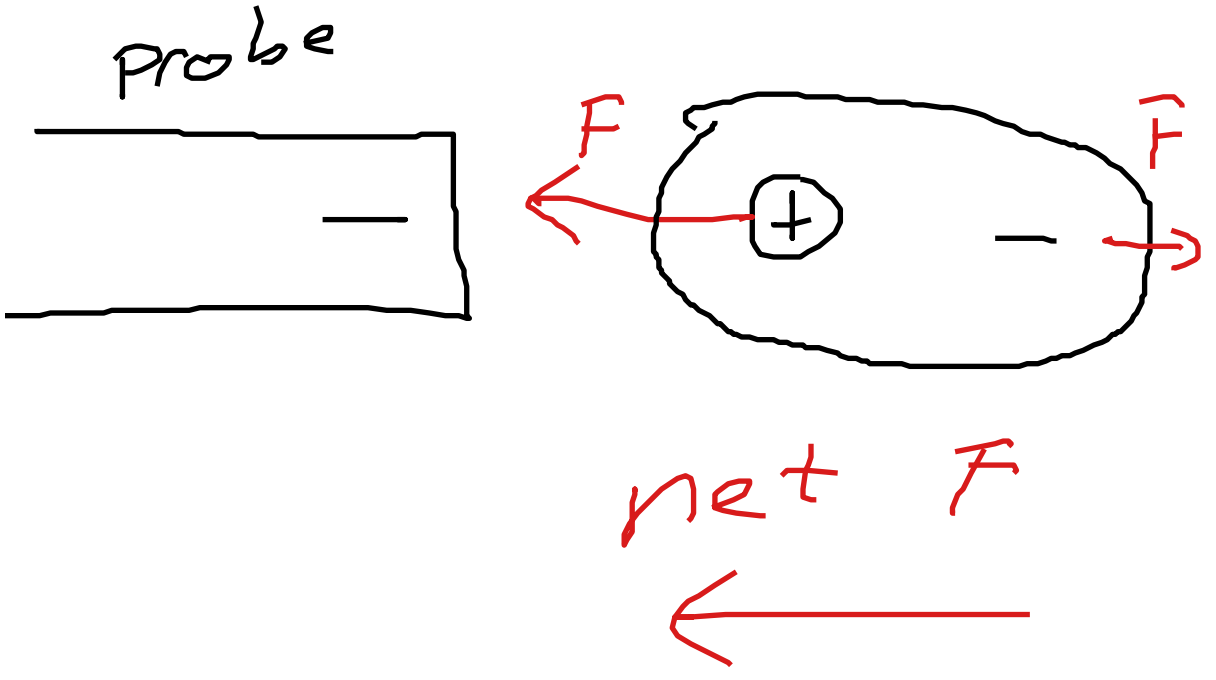
Atom





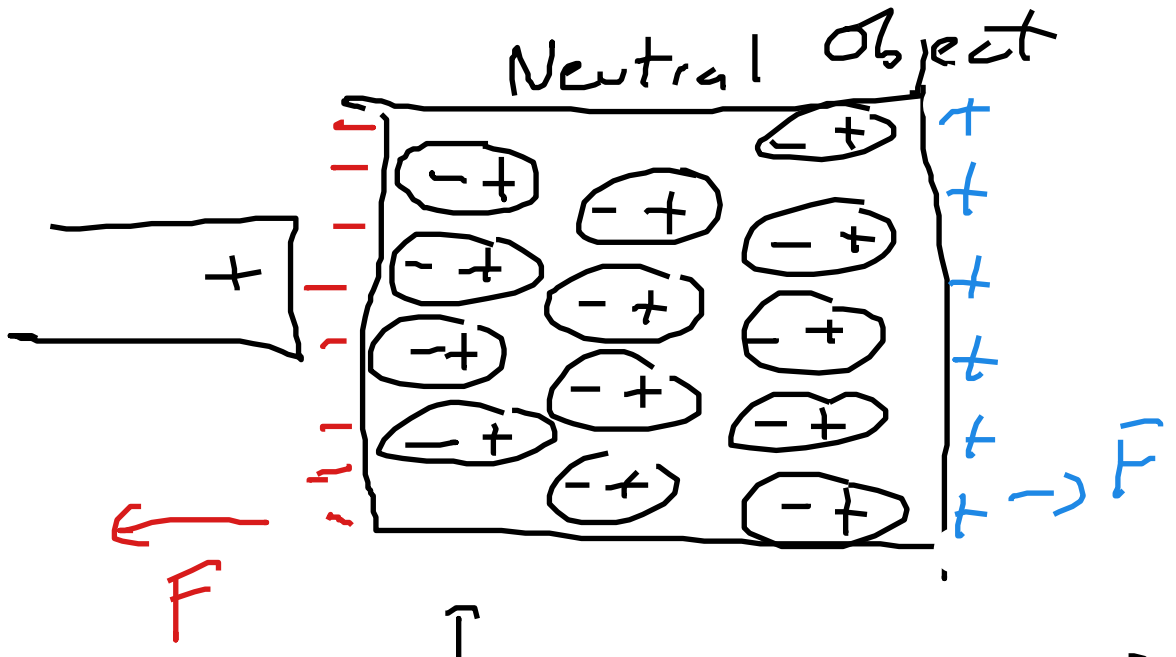
net F

Polarized atom is attracted to the probe.



Polarized atom is attracted to the probe.

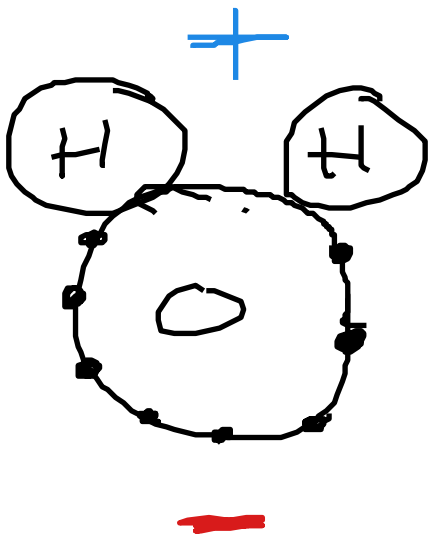
"Charged objects are attracted to neutral objects (that can be polarized)"



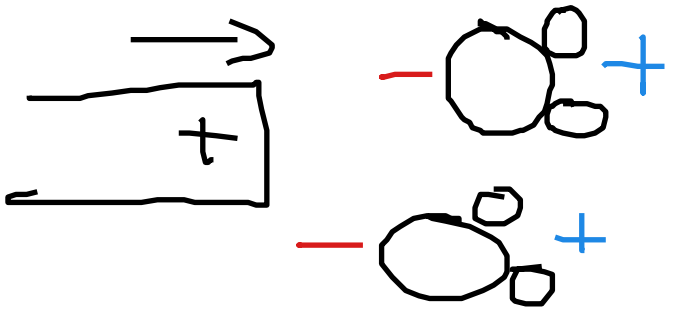
- becomes polarized
- is attracted to probe

Some Things are even better at polarizing...

- Water molecules are already polarized



TM

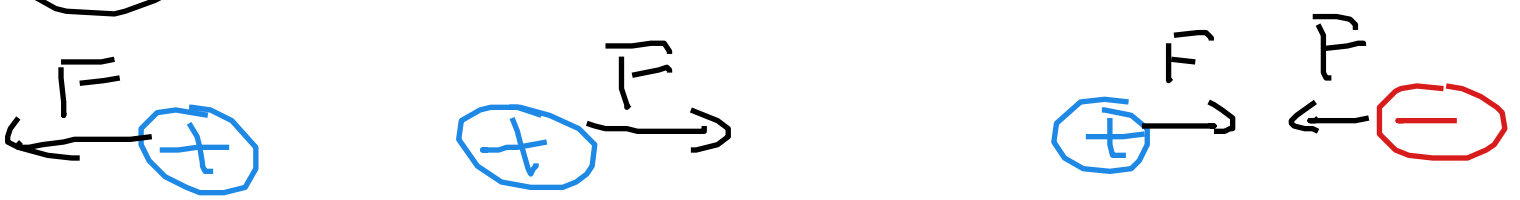


- Metals
  - every atom contributes 1 or more electrons to the "electron sea" & can move freely through the metal

metal

way more electrons than before
- much more strongly polarized

Coulomb's Law



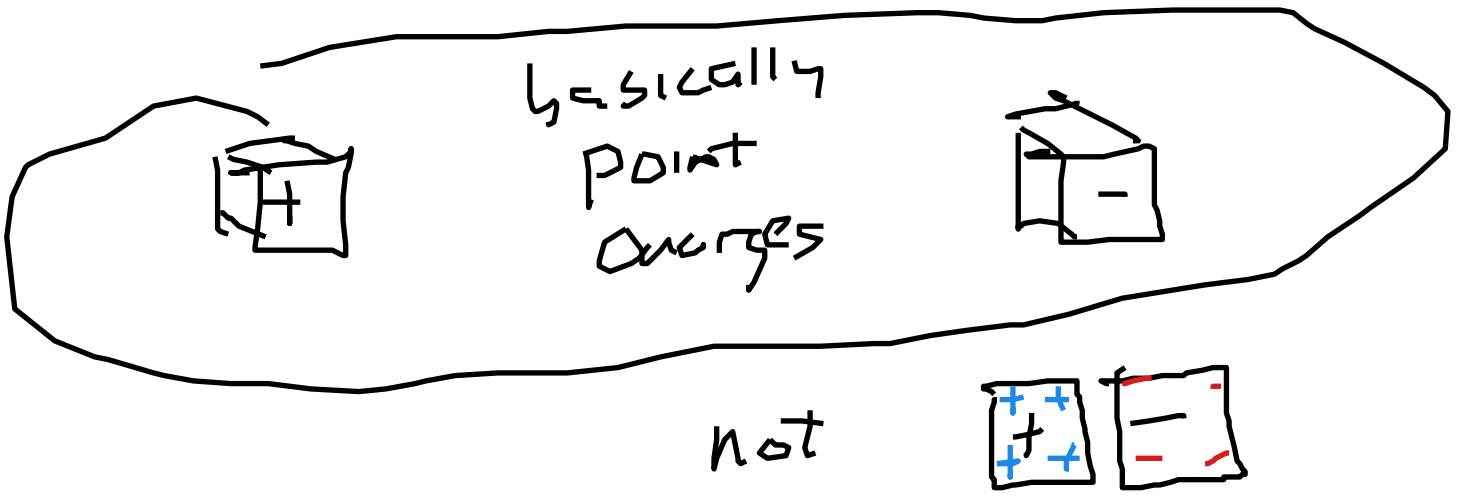
These electric forces:

- Charges feel a force directly away from like charges, directly towards opposite charges
- Both charges feel the same force

Magnitude of the force of one point charge q_1 on another point charge q_2

$$F = k\frac{|q_1 q_2|}{r^2}$$ Coulomb's Law

- point charge:
  - a charge with no size
  - a charge whose size is small compared to the distance to the other charge



- r is distance between charges

- F is magnitude of force.

  never negative

- $k = 9 \times 10^9 \frac{N m^2}{C^2}$

e.g.

person's weight ~ 500 – 1000N

$$F = \left(9 \times 10^9 \frac{N m^2}{C^2}\right) \frac{(1C)(1C)}{(1m)^2}$$

$$= 9 \times 10^9 N = 9 \text{ billion Newtons}$$

Coulombs are huge!

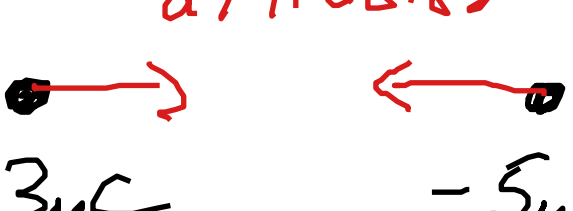
"m" = "$\times 10^{-3}$"

"μ" = "$\times 10^{-6}$"

= "e-6"

(3μ)C

(3×10^{-6})C



What is $\vec{F}$ on the $+3\mu$C charge?

- to the right

$\vec{F} = 0.84N \rightarrow$

$$F = (9\times10^{9})\frac{(3\mu)(\cancel{-}5\mu)}{(0.4)^2}$$

$$= 9\times10^{9}\,\frac{(3\times10^{-6})(5\times10^{-6})}{(0.4)^2} = 0.84N$$