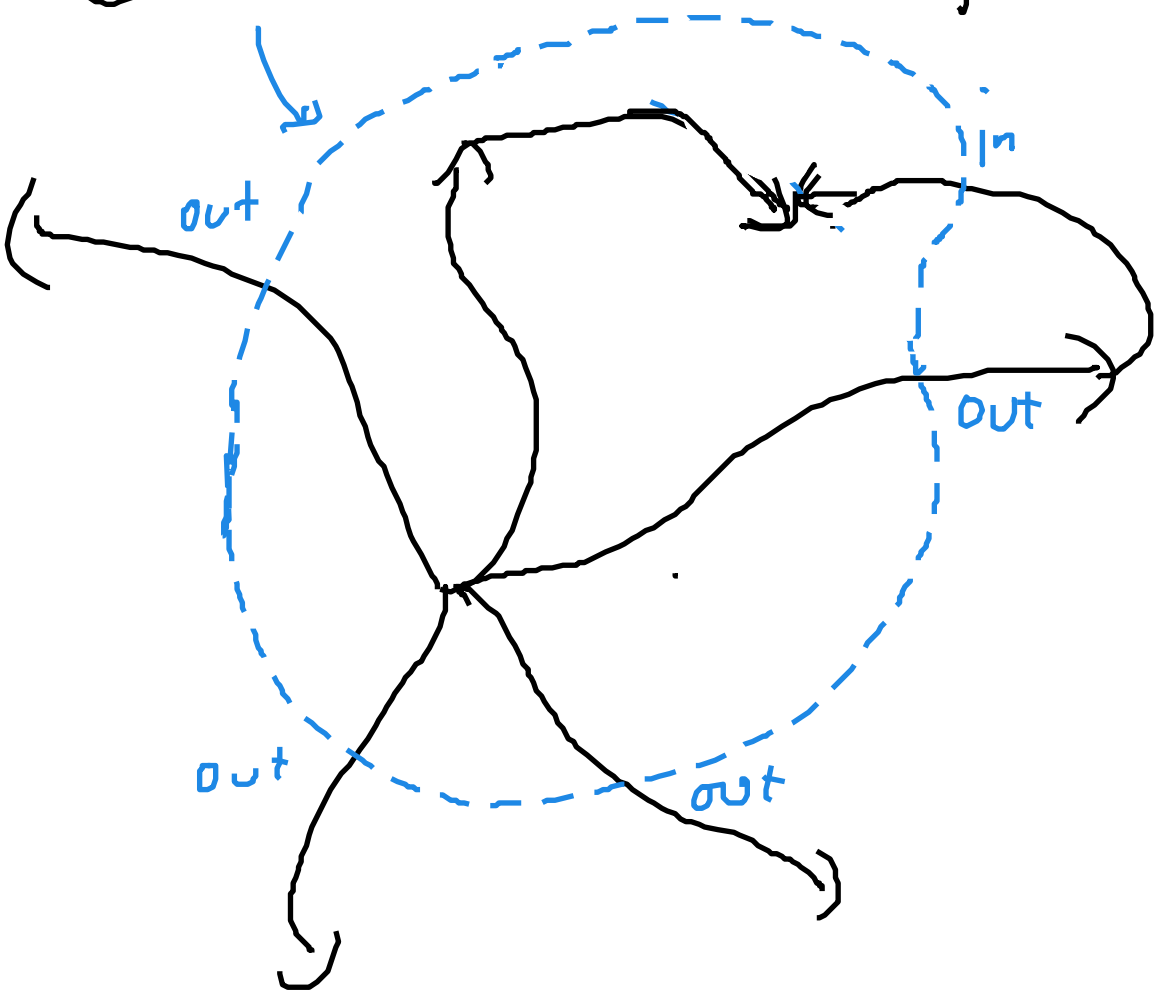
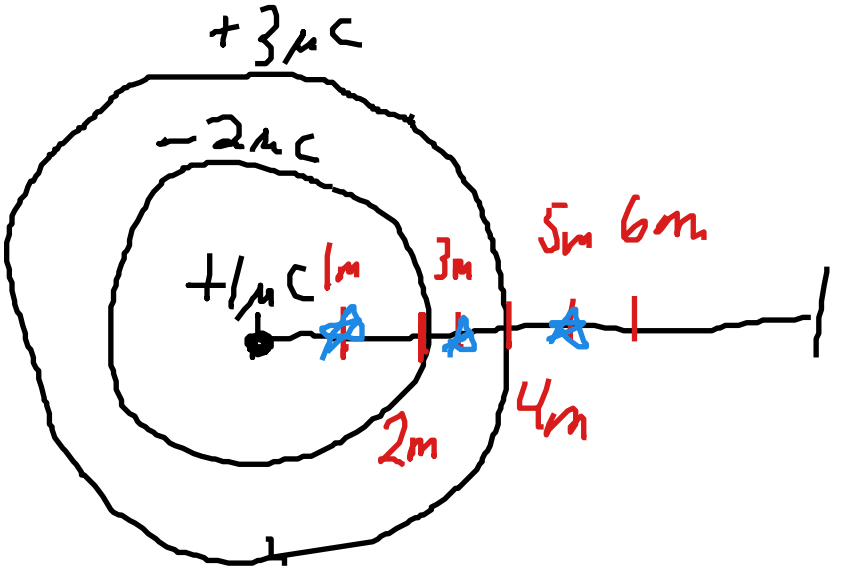
"Gaussian surface"



4 out − 1 in $\Rightarrow \oint = 3$

$\oint > 0 \rightarrow$ $q_{\text{total inside Surface}} > 0$



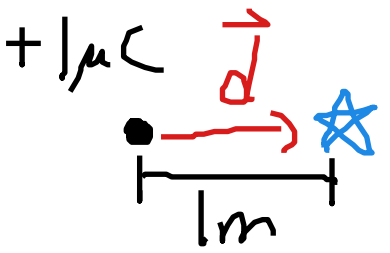
What is the electric field at the stars which are

- 1m from the center?
- 3m from the center?
- 5m ... ?

At 1m,

$$\vec{E} = k\frac{q}{d^2}\hat{d}$$

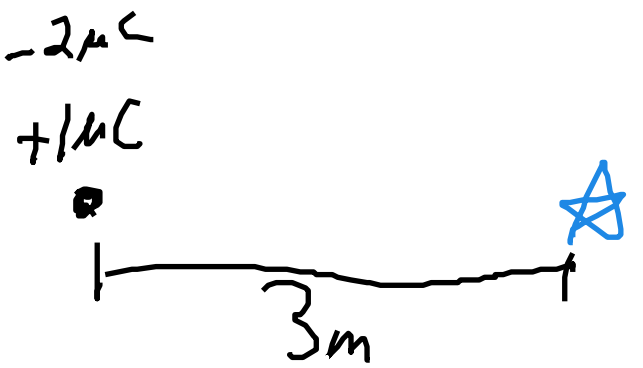
$$= (9\times10^9)\frac{(10^{-6})}{(1)^2} \rightarrow = 9000\frac{N}{C} \rightarrow$$



At 3m

$$\vec{E} = (9\times10^9)\frac{(-10^{-6})}{(3)^2} \rightarrow$$

$$1000\frac{N}{C} \leftarrow$$



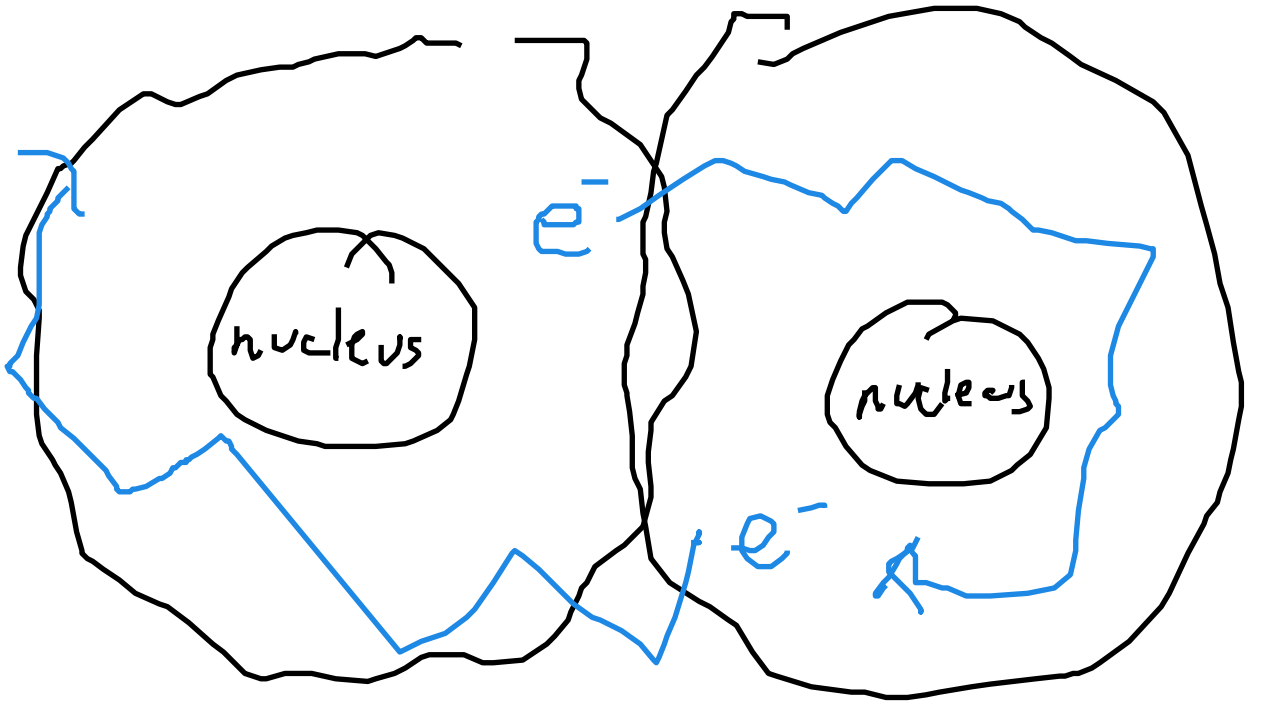
At 5m

$$\vec{E} = (9\times10^9)\frac{(2\times10^{-6})}{(5)^2} \rightarrow$$

$$= 0.72\times10^3 \rightarrow$$

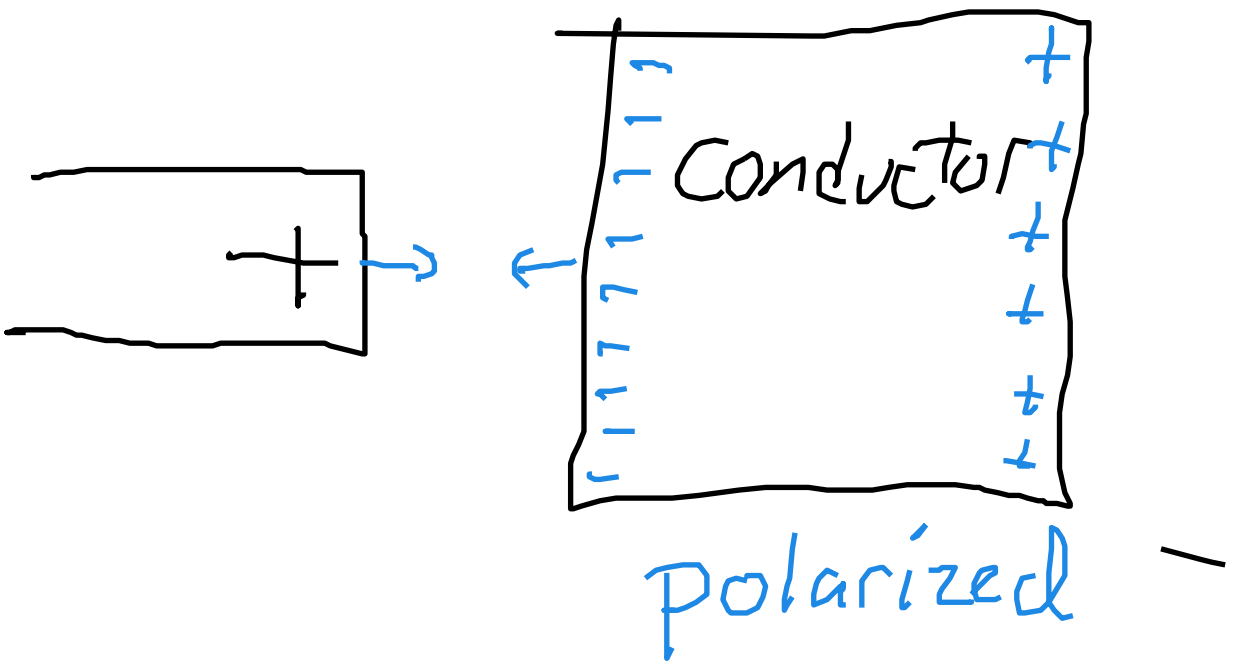
$$= 720\ N/C \rightarrow$$

Conductor

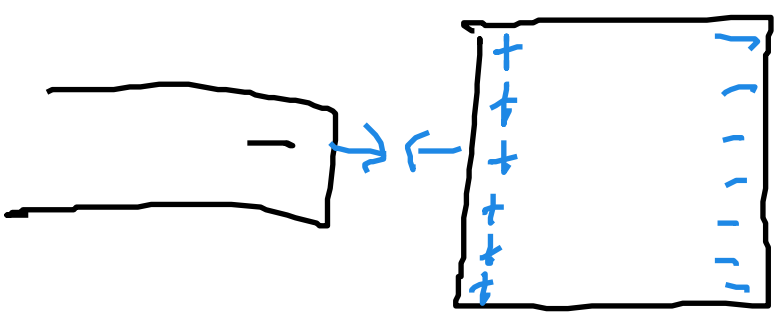


One or more "valence electrons" from each atom is allowed to roam freely through the material like kids in the 50s,

"Electron Sea"

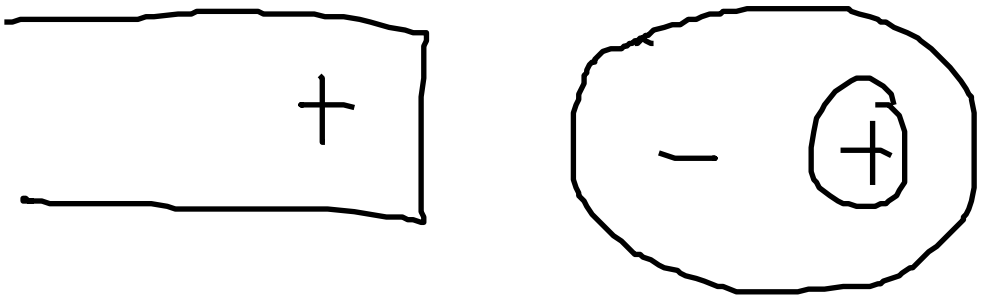


Positive rod is attracted to the negative layer more than it is repelled by the positive layer. Rod is attracted to the polarized conductor.



Negative rod is also attracted.

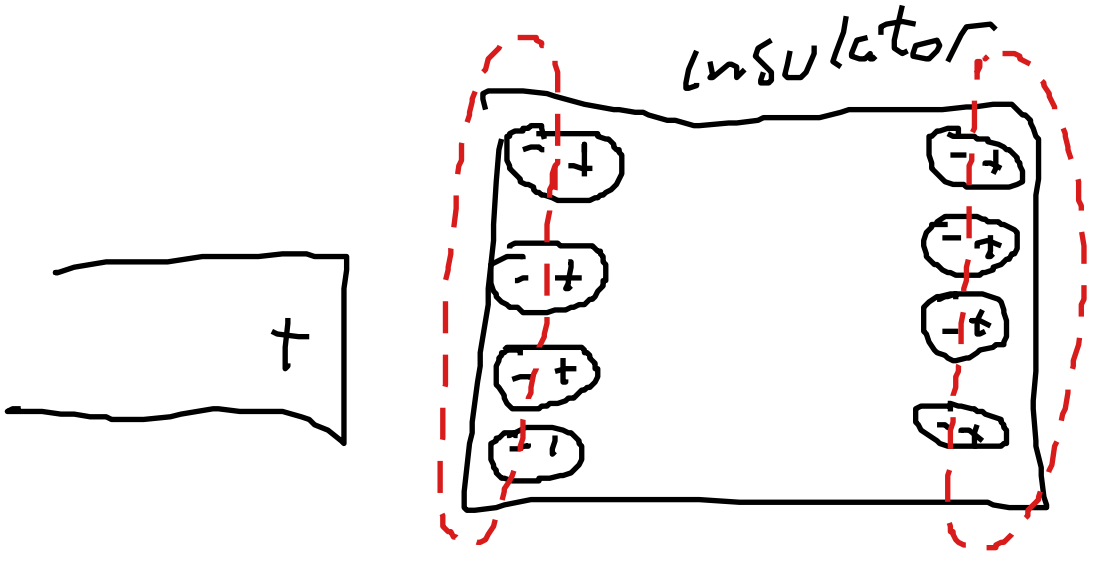
atoms can become polarized



Insulators

all electrons are bound tightly to their atoms and cannot roam

Like 90s kids afraid of predators



insulators can polarize too but not as much

Air is an insulator

but

if electric field gets too

strong it can rip an

electron from the atom

the

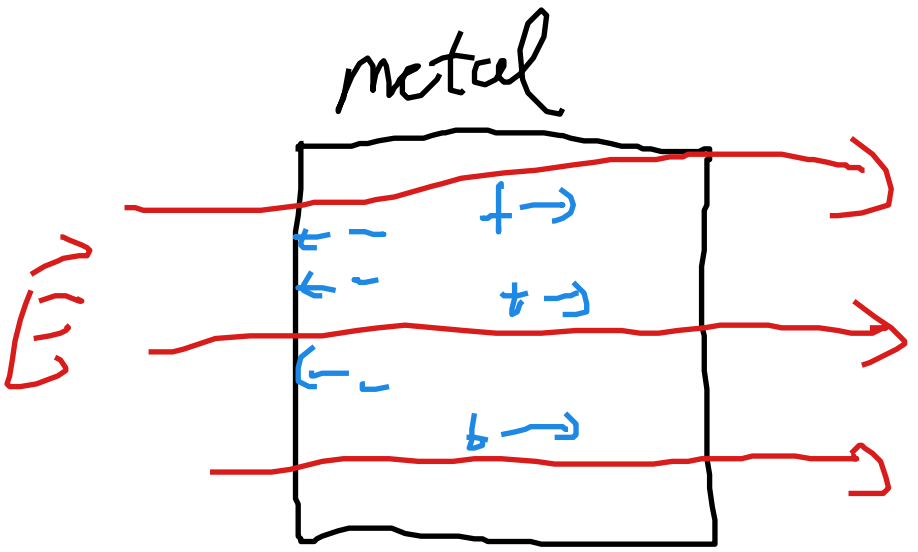
and then, slam back into

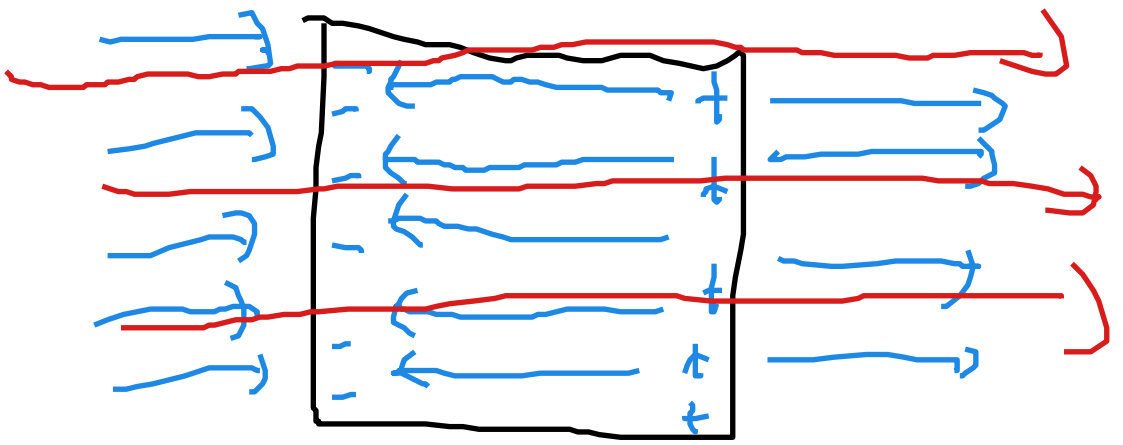
their atoms

Conductors have no electric field inside themselves if they are at equilibrium.

For a conductor in electrostatic equilibrium (no moving charge),

$\vec{E} = 0$ inside.





total $\vec{E}$: