

Define: Conductors = Charges Free to Move

Claim: $E = 0$ inside any conductor at equilibrium

Charges in conductor move to make E field zero inside. (Induced charge distribution).

If $E \neq 0$, then charge feels force and moves!

Claim: Excess charge on conductor only on surface at equilibrium

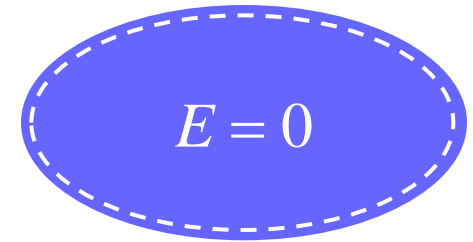
Why?

➤ Apply Gauss' Law

➤ Take Gaussian surface to be just inside conductor surface

➤ $E = 0$ everywhere inside conductor $\rightarrow \oint_{\text{surface}} \vec{E} \cdot d\vec{A} = 0$

➤ Gauss' Law: $\oint_{\text{surface}} \vec{E} \cdot d\vec{A} = \frac{Q_{\text{enc}}}{\epsilon_0} \rightarrow Q_{\text{enc}} = 0$



[SIMULATION 2](#)