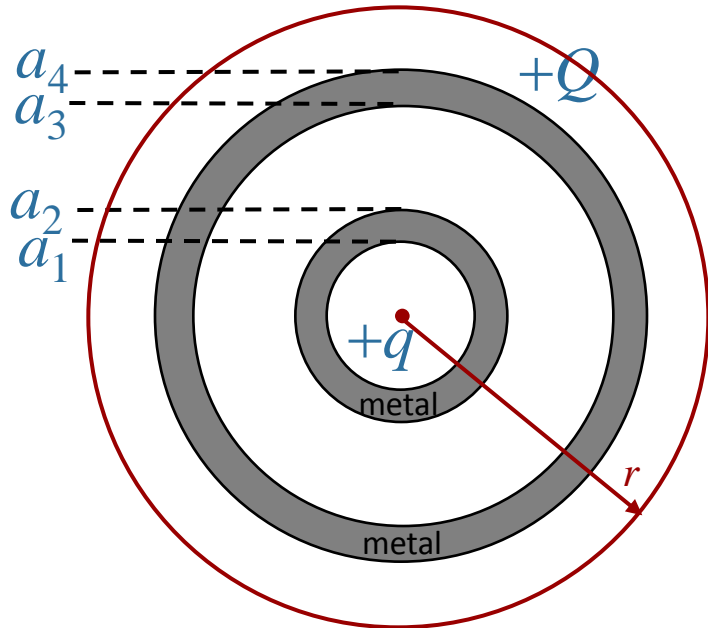


Calculation: Quantitative Analysis



cross-section



$r > a_4$: What is $E(r)$ outside spheres?

- A) 0 B) $\frac{1}{4\pi\epsilon_0} \frac{Q}{r^2}$ C) $\frac{1}{2\pi\epsilon_0} \frac{Q+q}{r}$

D) $\frac{1}{4\pi\epsilon_0} \frac{Q+q}{r^2}$

E) $\frac{1}{4\pi\epsilon_0} \frac{Q-q}{r^2}$

Why?

Gauss' law: $\int \vec{E} \cdot d\vec{A} = \frac{Q_{\text{enclosed}}}{\epsilon_0}$

$$E4\pi r^2 = \frac{Q+q}{\epsilon_0}$$

→ $E = \frac{1}{4\pi\epsilon_0} \frac{Q+q}{r^2}$