With $\nabla \times \mathbf{E} = 0$, we know that,

$$\oint \mathbf{E} \cdot d\mathbf{l} = 0$$

If we choose a loop that includes a metal and vacuum (i.e., both in and just outside of the metal), we know that the contribution to this integral in the metal vanishes. What can we say about the contribution just outside the metal?

A. It vanishes also
B. $\mathbf{E}$ must be zero out there
C. $\mathbf{E}$ must be perpendicular to d$\mathbf{l}$ everywhere
D. $\mathbf{E}$ is perpendicular to the metail surface
E. More than one of these

ANNOUNCEMENTS

- Exam 1 TONIGHT (7pm-9pm)
  - A149 PSS; Across from FRIB (Wilson side)
- Homework 6 is posted (Due next Wed.)

PHYSICS COLLOQUIUM

BREAKING THE MYTH OF THE "NON-TRADITIONAL" PHYSICIST

THE REAL STORY ABOUT EMPLOYMENT FOR PHYSICS GRADUATES

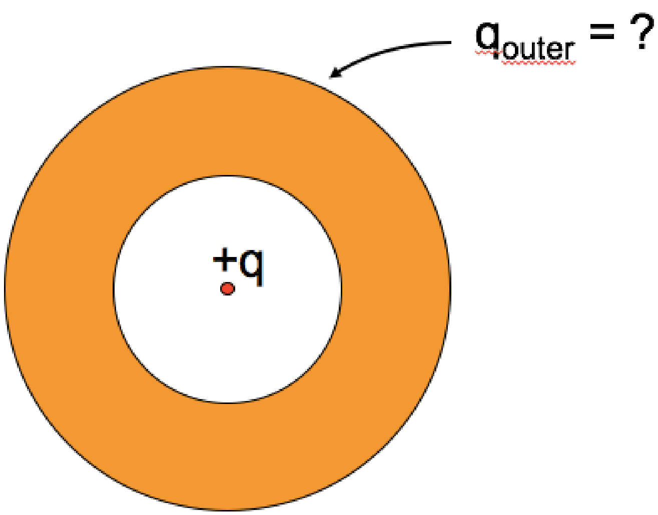
Crystal Bailey

Careers Program Manager

American Physical Society

In this room, tomorrow 4:10pm-5pm

A neutral copper sphere has a spherical hollow in the center. A charge $+q$ is placed in the center of the hollow. What is the total charge on the outside surface of the copper sphere? (Assume Electrostatic equilibrium.)



A. Zero

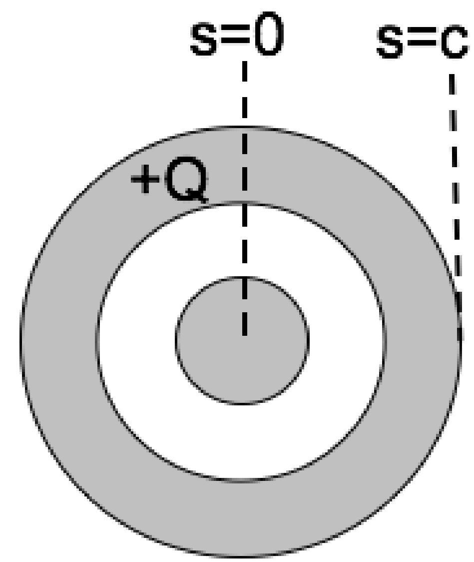
B. $-q$

C. $+q$

D. $0 < q_{outer} < +q$

E. $-q < q_{outer} < 0$

A long coax has total charge $+Q$ on the OUTER conductor. The INNER conductor is neutral.



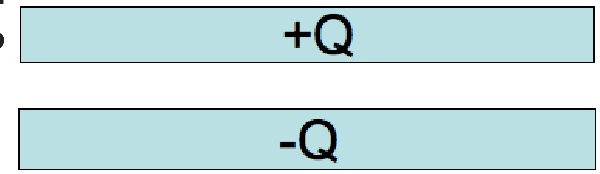
What is the sign of the potential difference, $\Delta V = V(c) - V(0)$, between the center of the inner conductor ($s = 0$) and the outside of the outer conductor?

A. Positive

B. Negative

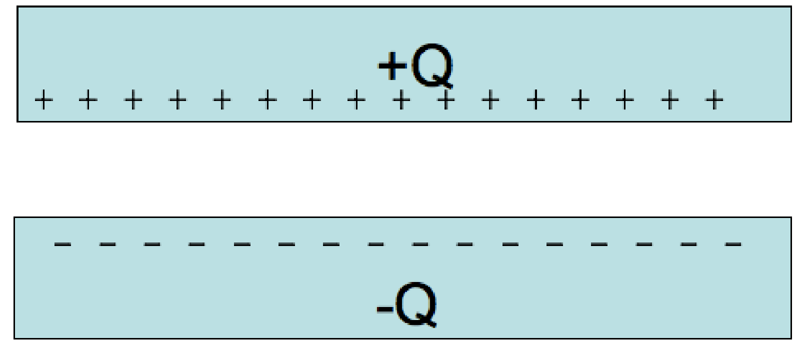
C. Zero

Given a pair of very large, flat, conducting capacitor plates with total charges $+Q$ and $-Q$. Ignoring edges, what is the equilibrium distribution of the charge?



A. Throughout each plate
B. Uniformly on both side of each plate
C. Uniformly on top of $+Q$ plate and bottom of $-Q$ plate
D. Uniformly on bottom of $+Q$ plate and top of $-Q$ plate
E. Something else

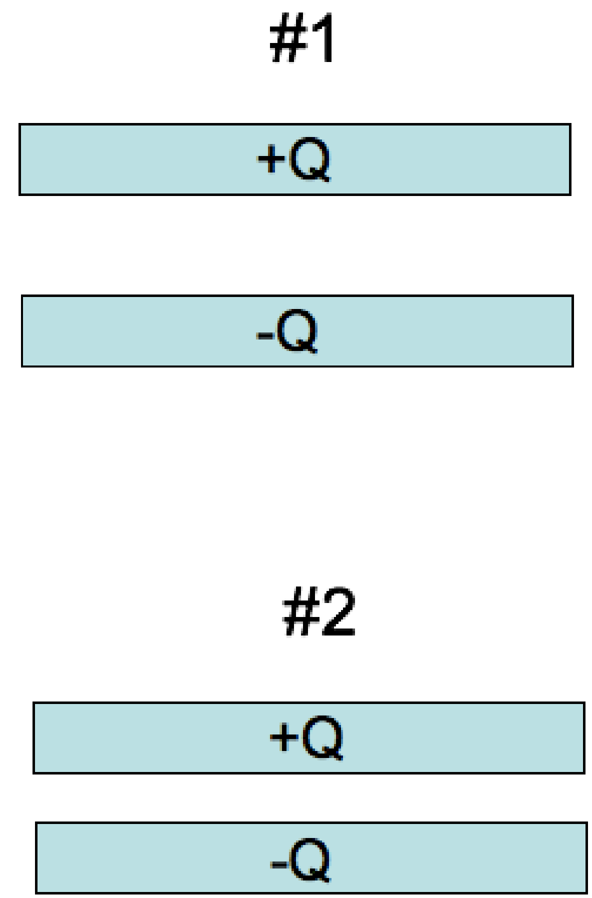
Given a pair of very large, flat, conducting capacitor plates with surface charge densities $+/-\sigma$, what is the E field in the region between the plates?

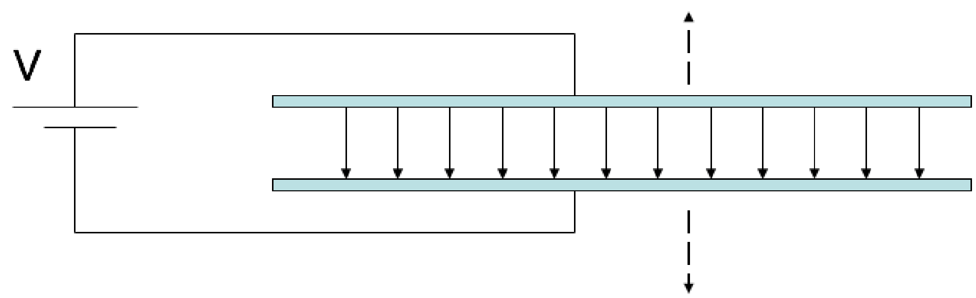


A. $\sigma/2\varepsilon_0$
B. σ/ε_0
C. $2\sigma/\varepsilon_0$
D. $4\sigma/\varepsilon_0$
E. Something else

You have two very large parallel plate capacitors, both with the same area and the same charge Q. Capacitor #1 has twice the gap of Capacitor #2. Which has more stored potential energy?

A. #1 has twice the stored energy
B. #1 has more than twice
C. They both have the same
D. #2 has twice the stored energy
E. #2 has more than twice.

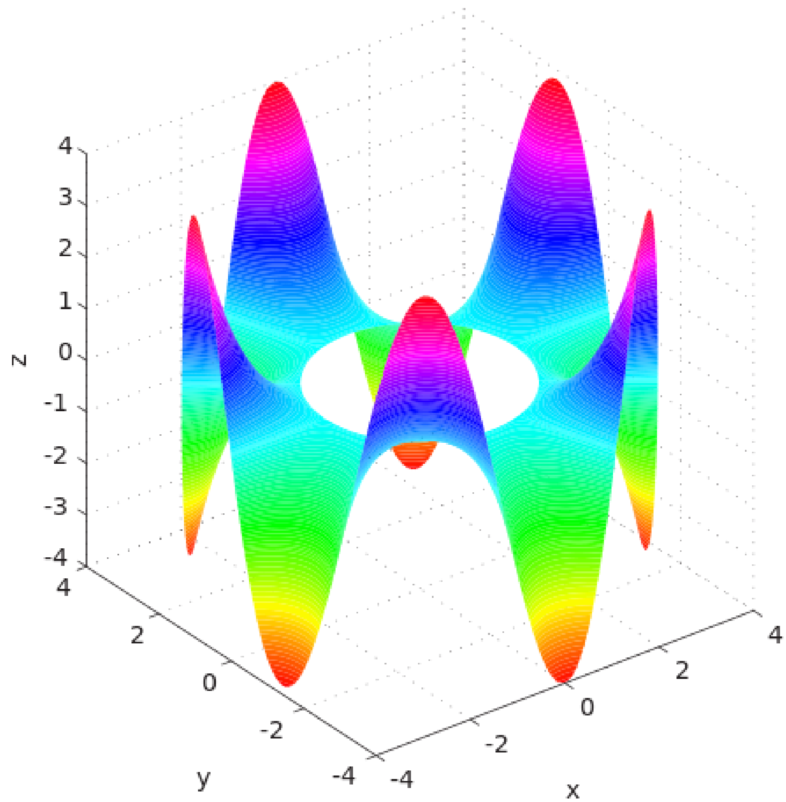


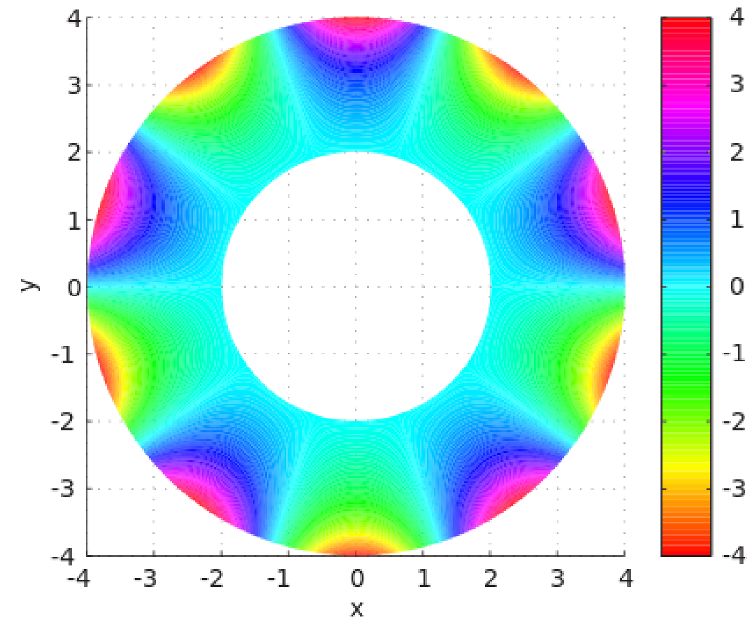


A parallel plate capacitor is attached to a battery which maintains a constant voltage difference V between the capacitor plates. While the battery is attached, the plates are pulled apart. The electrostatic energy stored in the capacitor

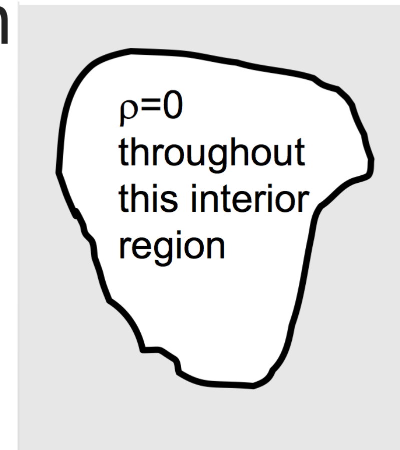
A. increases.
B. decreases.
C. stays constant.

LAPLACE'S EQUATION



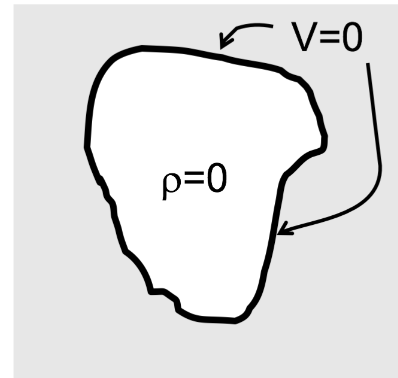


A region of space contains no charges. What can I say about V in the interior?



A. Not much, there are lots of possibilities for V(r) in there
B. V(r)=0 everywhere in the interior.
C. V(r)=constant everywhere in the interior

A region of space contains no charges. The boundary has V=0 everywhere. What can I say about V in the interior?



A. Not much, there are lots of possibilities for V(r) in there
B. V(r)=0 everywhere in the interior.
C. V(r)=constant everywhere in the interior