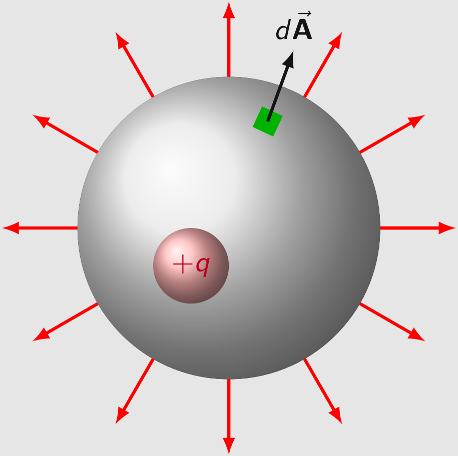
Announcements

- Homework 2 due tonight!
  - Please remember to associate each page with a problem
  - Any Jupyter work should be saved as a pdf and then combined with your work
  - I really prefer pdfs over images
    - See *Scannable* or *Genius Scan* apps for nice ways to do this from a phone
    - Or use an online converter
  - Also remember to turn in Friday's Visualization tutorial as well by the end of today
- Homework 3 should be posted today
- Wednesday Reading: Ch 1, Sections 5

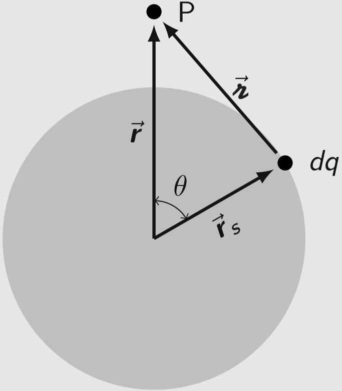
Gauss's Law



$$\oint_S \vec{\mathbf{E}} \cdot d\vec{\mathbf{A}} = \int_V \frac{\rho}{\epsilon_0}\, d\tau$$

Good ol' Gauss

Given the location of the little bit of charge dq, what is $\mathscr{r}$?



A. $\sqrt{z^2 + r_s^2}$

B. $\sqrt{z^2 + r_s^2 - 2zr_s \cos\theta}$

C. $\sqrt{z^2 + r_s^2 + 2zr_s \cos\theta}$

D. Something else

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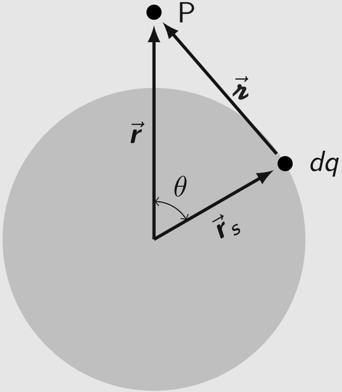

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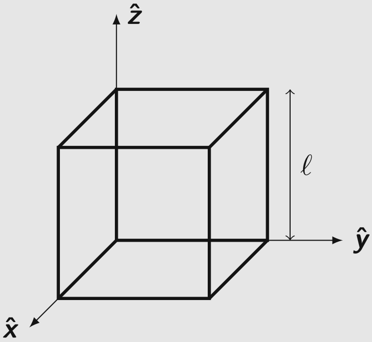
The space in and around a cubical box (edge length ℓ) is filled with a constant uniform electric field, $\vec{\mathbf{E}} = E_0\hat{\boldsymbol{y}}$. What is the total electric flux $\oint_S \vec{\mathbf{E}} \cdot d\vec{\mathbf{A}}$ through this closed surface?

A. 0
B. $E_0\ell^2$
C. $2E_0\ell^2$
D. $6E_0\ell^2$



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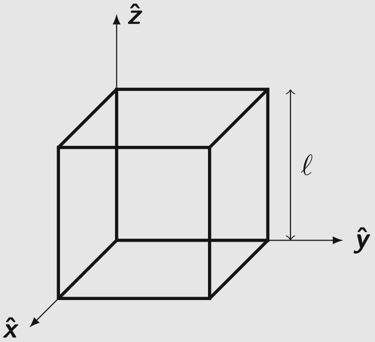
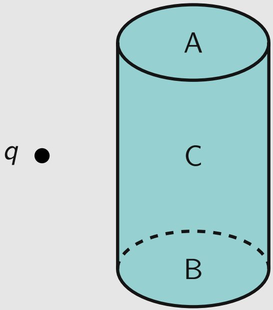


A positive point charge is place outside a closed cylindrical surface as shown. The closed surface is comprised of the end caps (A and B) and the curved side surface (C). What is the sign of the electric flux through surface C?



A. Positive
B. Negative
C. Zero
D. Not enough information to decide

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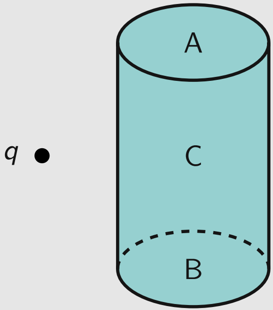

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C. Zero
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Consider a cube of constant charge density centered at the origin.
True or False: You can use Gauss's Law to find the electric field directly above the center of the cube.

A. True, and I can argue how we'd do it.
B. True. I'm sure we can, but I not 100% sure how right off.
C. False. I'm pretty sure we can't, but I can't say for sure why.
D. False, and I can argue why we can't do it.

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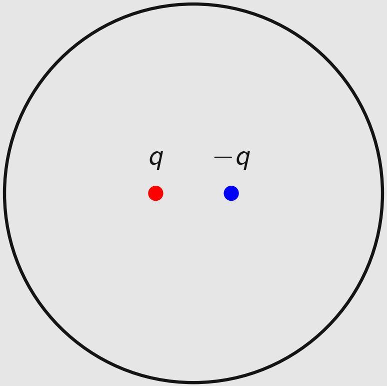
An electric dipole ($+q$ and $-q$, a small distance d apart) sits centered in a Gaussian sphere. What can you say about the flux of $\vec{\mathbf{E}}$ through the sphere, and the $|\vec{\mathbf{E}}|$ on the sphere?

A. Flux $= 0$, E $= 0$ everywhere on the sphere surface

B. Flux $= 0$, E need not be zero everywhere on the surface

C. Flux is not 0, E $= 0$ everywhere on the sphere

D. Flux is not 0, E need not be zero everywhere on the surface



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