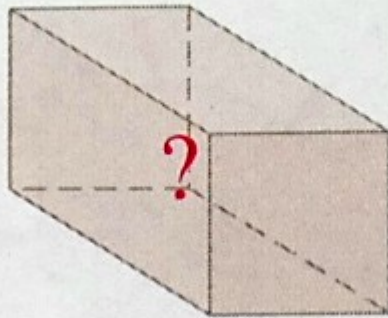
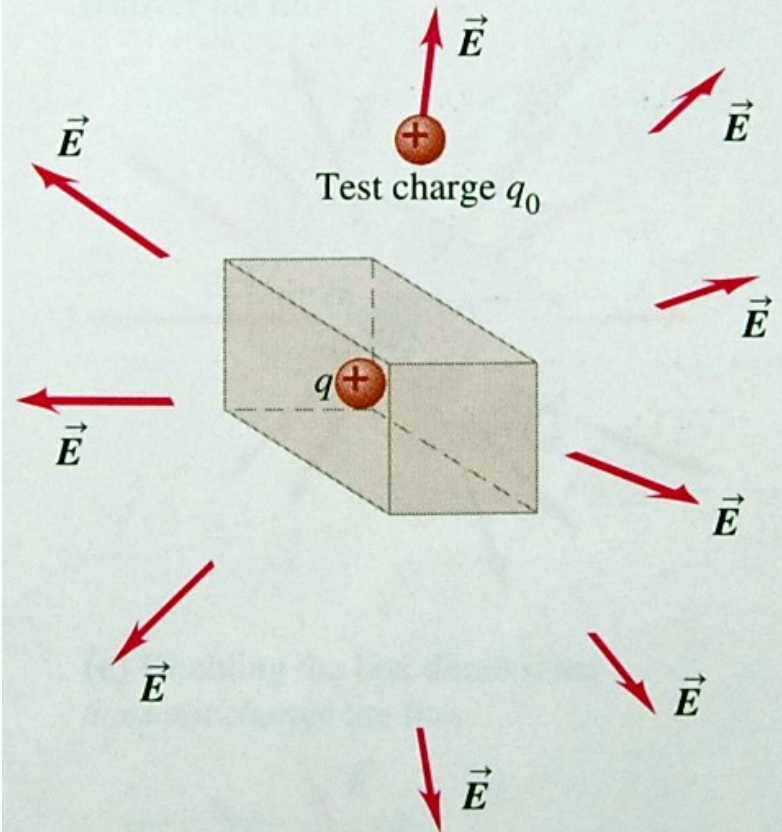


How to measure the charge by a non-local measurement?

(a) A box containing an unknown amount of charge

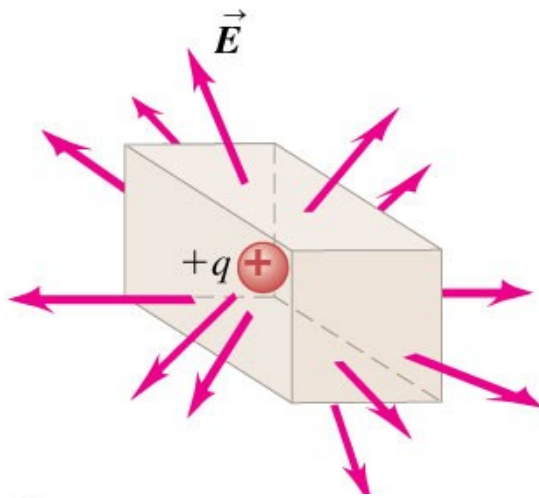


(b) Using a test charge outside the box to probe the amount of charge inside the box

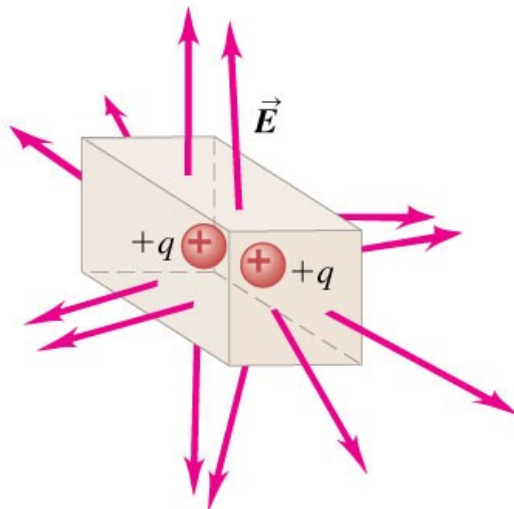


Electric Flux

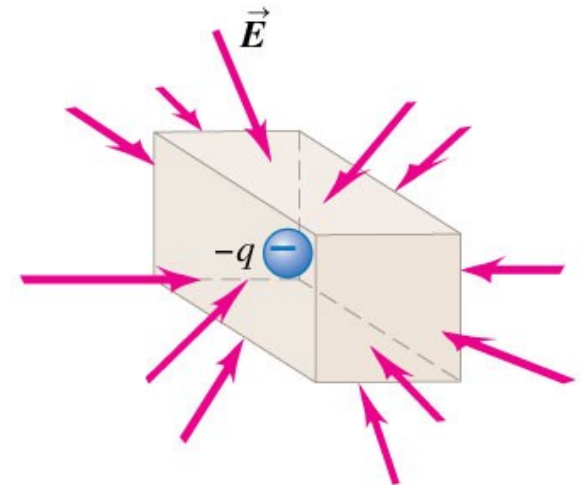
(a) Positive charge inside box, outward flux



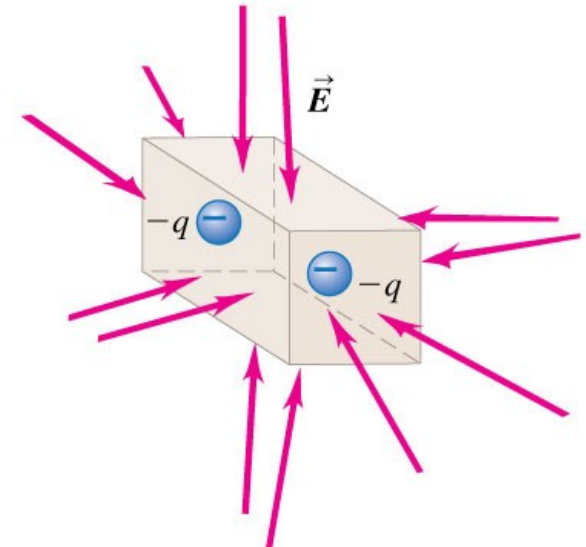
(b) Positive charges inside box, outward flux



(c) Negative charge inside box, inward flux

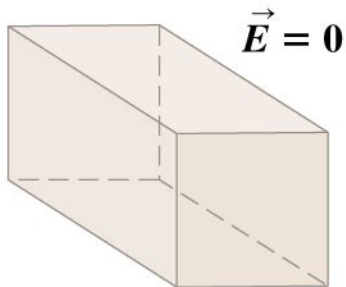


(d) Negative charges inside box, inward flux

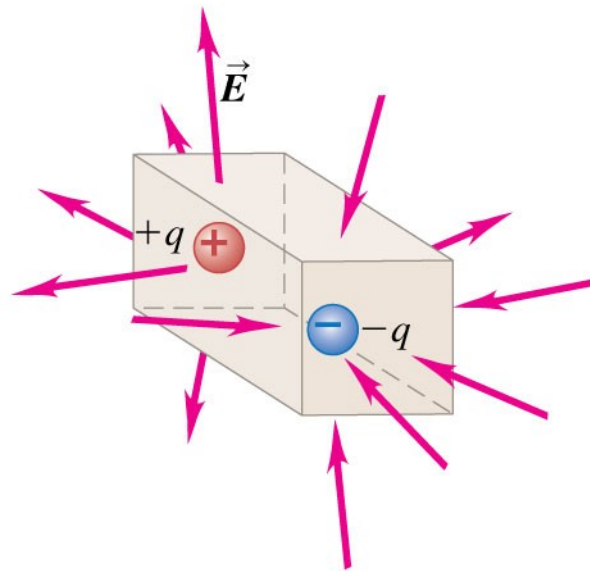


Zero Electric Flux

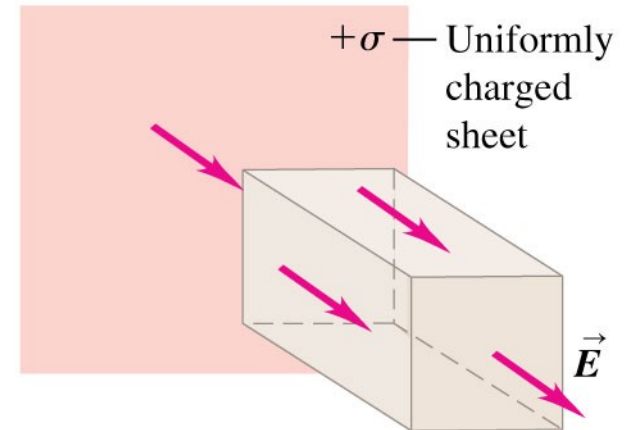
(a) No charge inside box,
zero flux



(b) Zero *net* charge inside box,
inward flux cancels outward flux.

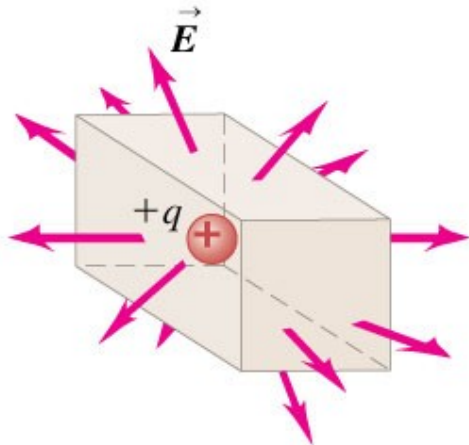


(c) No charge inside box,
inward flux cancels outward flux.



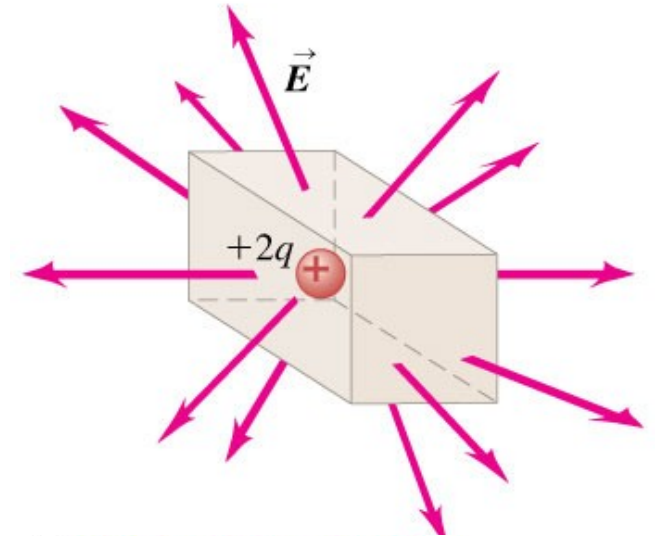
Electric Flux: Scaling Properties

(a) A box containing a charge

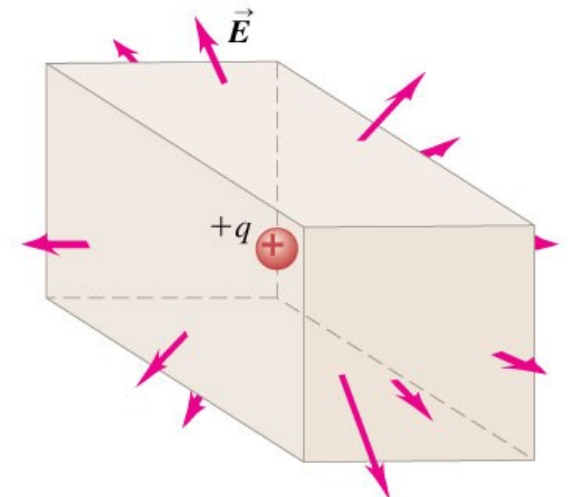


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(b) Doubling the enclosed charge doubles the flux.



(c) Doubling the box dimensions does not change the flux.



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Faraday's Icepail Experiment

