Physical Sciences (PHYS 1410)

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Website: http://www.yorku.ca/cberge/1410W2013/index.htm

Reference/Acknowledgement:
- College Physics (Giordano)
- Physics (Halliday & Resnick)

Coulomb's setup for measuring forces due to charge

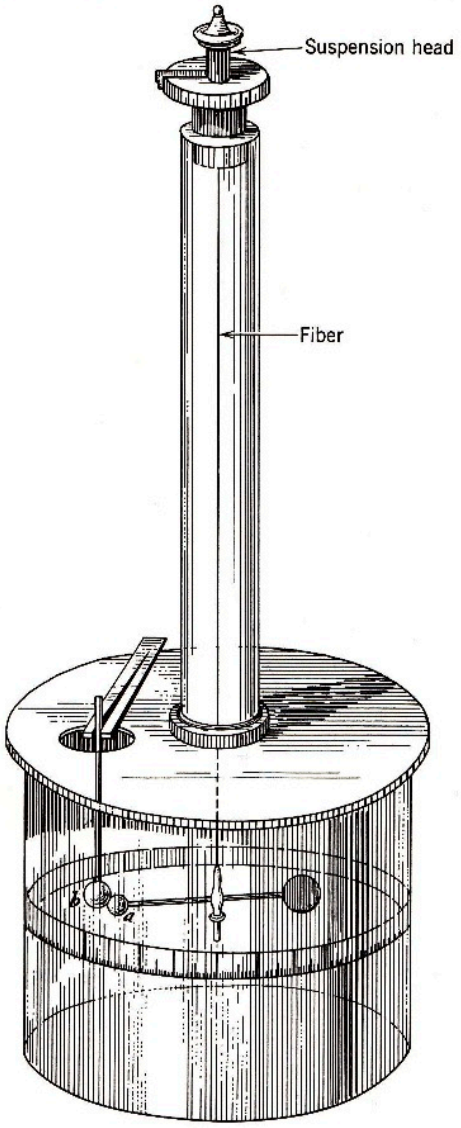
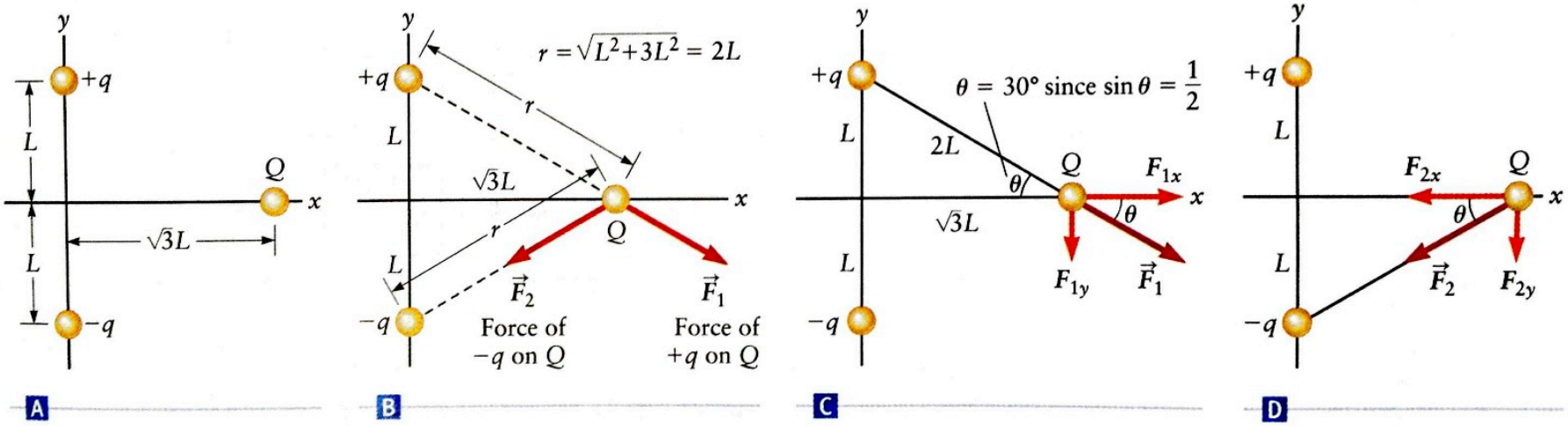


Fig. 26–2 Coulomb's torsion balance from his 1785 memoir to the French Academy of Sciences.

Electric dipole → Consider forces acting upon a nearby charge (Q)



▲ **Figure 17.7** Example 17.2. Calculation of the force exerted by a dipole (charges $+q$ and $-q$) on a third charge Q.

ex. (Giordano prob.14.24)

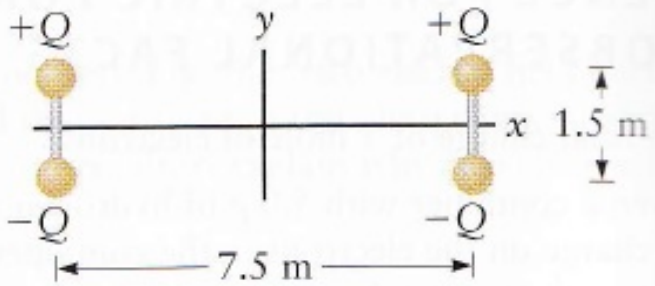
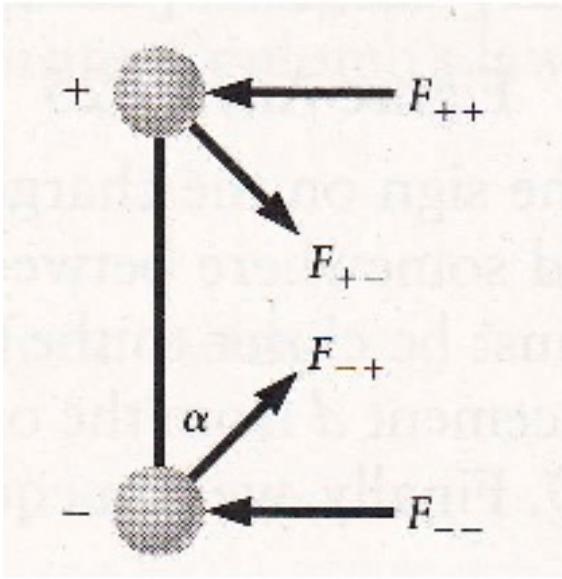
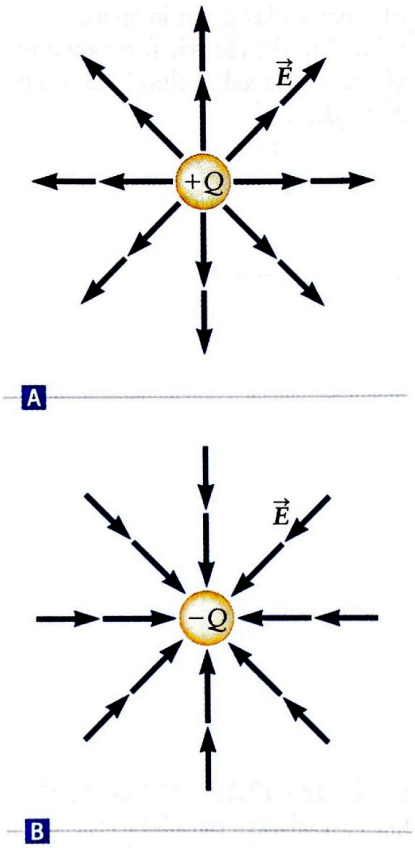


Figure P17.24

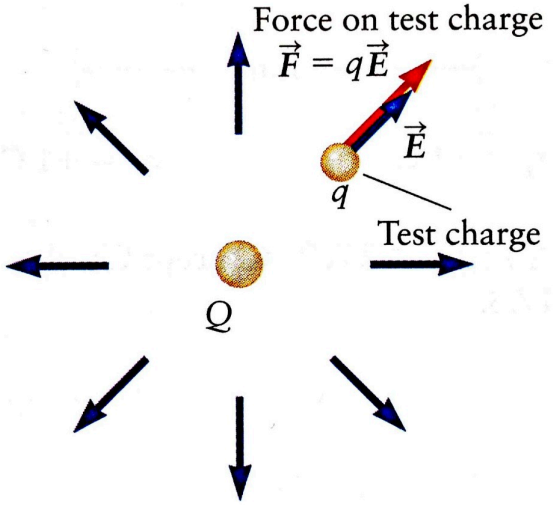


Electric Field



▲ **Figure 17.10** Electric field near a point charge placed at the origin. A If the charge is positive, the electric field is directed outward away from the charge, while B if the charge is negative, the field lines are directed inward toward the charge.

Electric field of a point charge



▲ **Figure 17.11** The electric field at a particular point in space is related to the electric force on a test charge q placed at that location by $\vec{F} = q\vec{E}$.

Electric Field

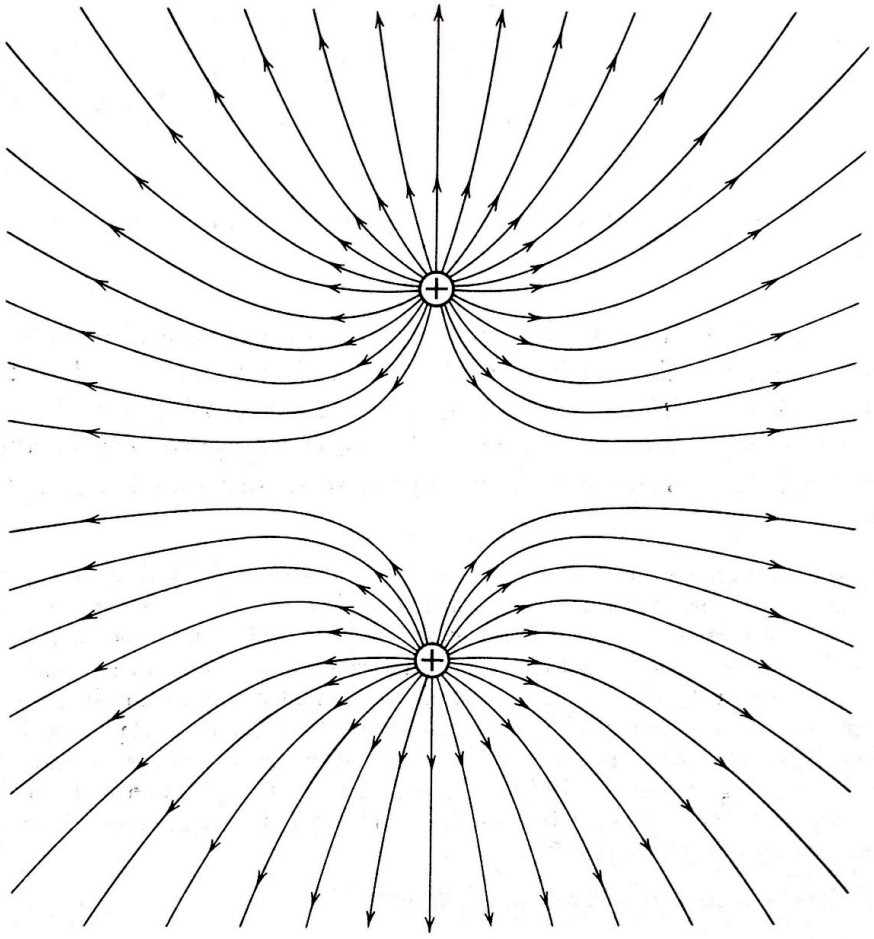


Fig. 27–4 Lines of force for two equal positive charges.

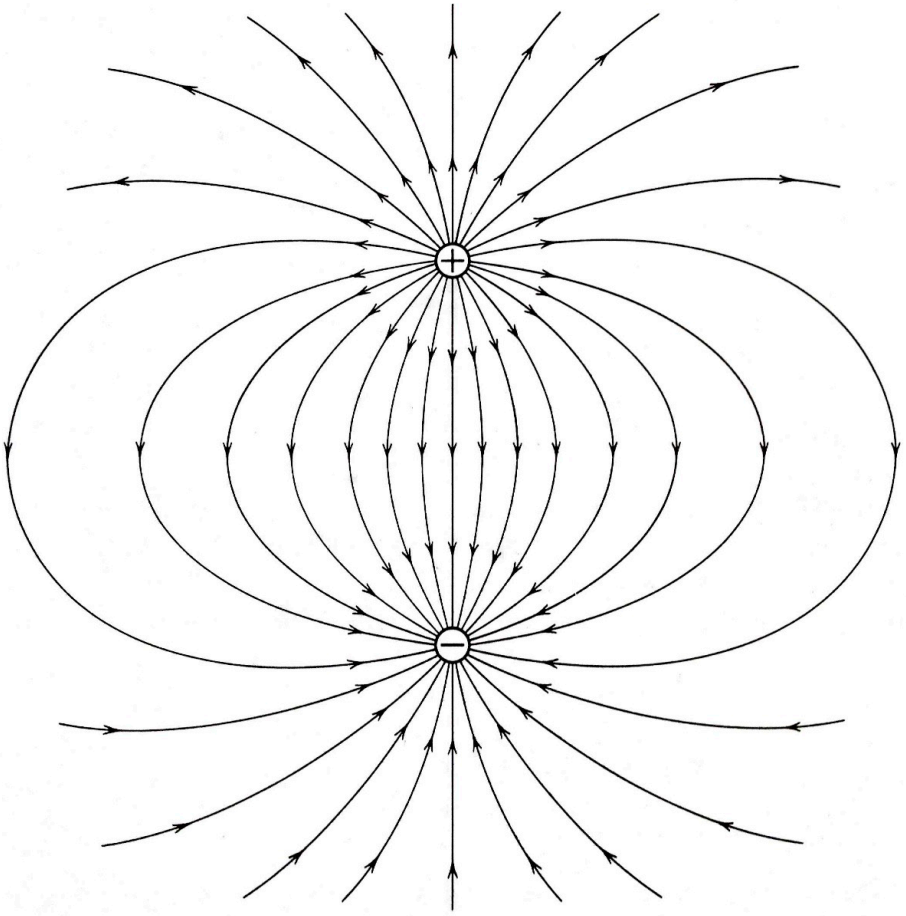
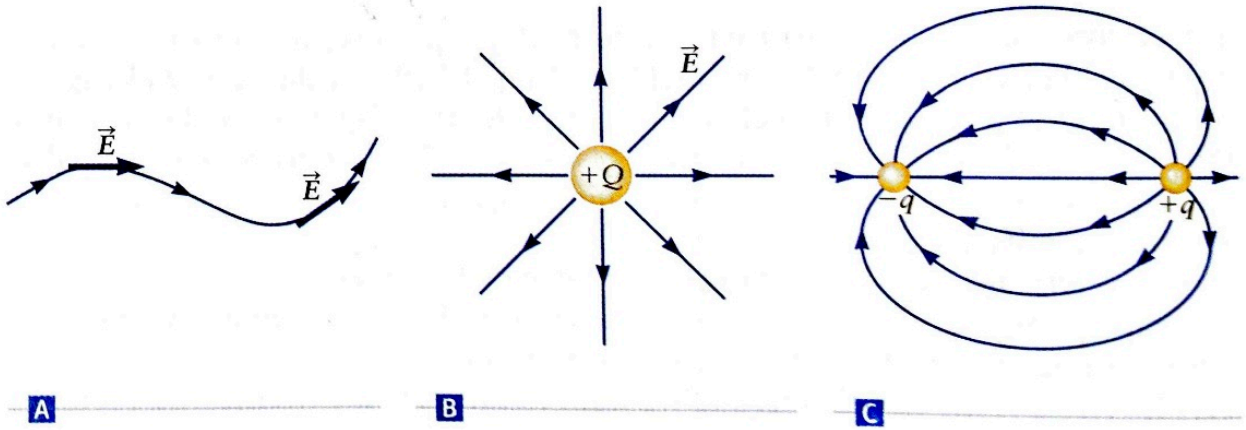


Fig. 27–5 Lines of force for equal but opposite charges.

Electric Field → What do all these 'lines' means?

► **Figure 17.12** A Electric field lines are always parallel to the electric field. B and C Examples of electric field lines.



Electric Field Lines
→ Apparent ‘in a dish’

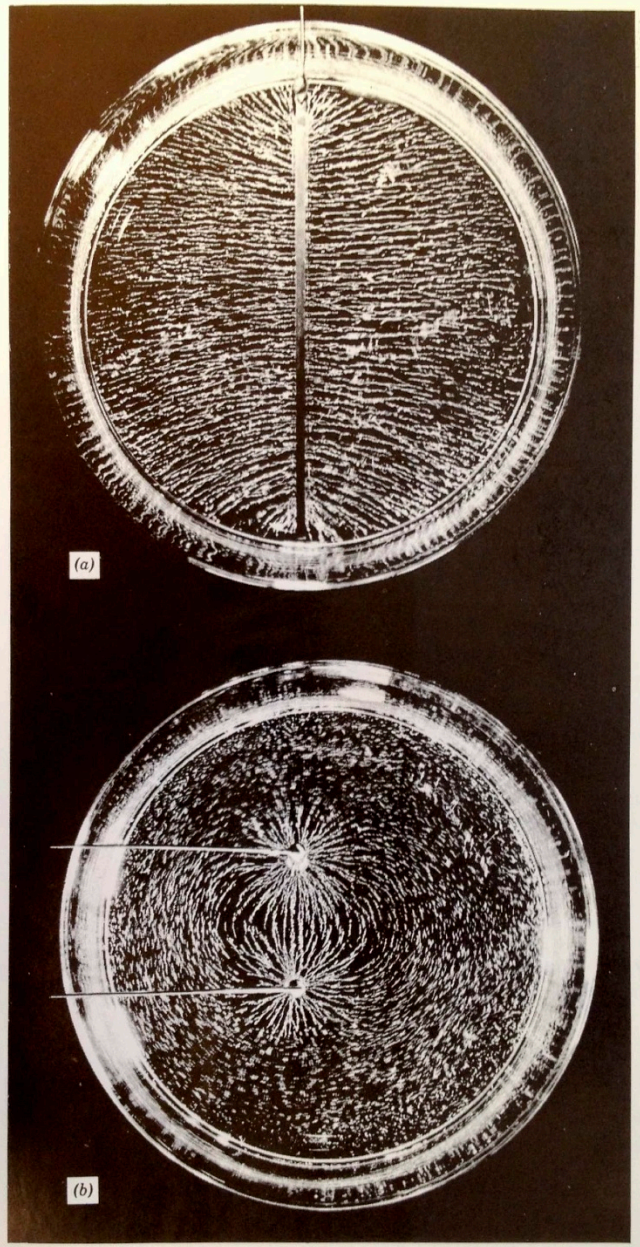


Fig. 27–6 Photographs of the patterns of electric lines of force around (*a*) a charged plate (compare Fig. 27–2), and (*b*) two rods with equal and opposite charges (compare Fig. 27–5). The patterns were made by suspending grass seed in an insulating liquid. (Courtesy Educational Services Incorporated, Watertown, Mass.)