

**Problem 59.** Two small spheres of mass  $m$  are suspended from strings of length  $l$  that are connected at a common point. One sphere has charge  $Q$ , and the other has charge  $2Q$ . The strings make angles  $\theta_1$  and  $\theta_2$  with the vertical. (a) How are  $\theta_1$  and  $\theta_2$  related? (b) Assume that  $\theta_1$  and  $\theta_2$  are small. Show that the distance  $r$  between the spheres is given by

$$r \approx \left( \frac{4k_e Q^2 l}{mg} \right)^{1/3} \quad (1)$$