Answer on Question #45704, Physics, Electromagnetism

A small object has charge Q. Charge q is removed from it and placed on a second small object. The two objects are placed 1 m apart. For the force that each object exerts on the other to be a maximum, q should be:

From the Coulomb law force will be :

$$\left|F_{Qq}\right| = k\frac{q*(Q-q)}{r^2}$$

Where r is the distance between the charges and k some constant (it depends form the units system) . Maximum analysis include derivative investigation :

Where derivative equals to zero there will be maximum or minimum.

Take derivative above the q

$$\left|F_{Qq}\right|' = \left(k\frac{q*(Q-q)}{r^2}\right)' = k\frac{(Q-2q)}{r^2}$$

And then equate to zero :

$$k\frac{(Q-2q_x)}{r^2} = 0$$

$$q_x = \frac{Q}{2}$$