CAS PY 106

Pre-Session Note 2

Coulomb’s Law

1. The force between electric charges
2. Two charged objects, of charge q and Q, separated by a distance r, exert a force on one another. The magnitude of this force is given by

Coulomb’s Law: F = kqQ/r^2 where k is a constant 8.99 \* 10^9 N m^2/C^2 which is about 9 \*10^9 N m^2/C^2

1. The direction of the force on first object is toward the second object if they have opposite signs and away from second object if the signs are the same
2. Comparing gravity and the interaction between charges

F = GmM/r^2

F = kqQ/r^2

1. In general, the force of gravity is much weaker than electrostatic interactions
2. Gravity is always attractive, while force between charges can be attractive or repulsive
3. The equations have similar forms, giving rise to similar behavior
4. Magnitude of Force
5. Two equal charges Q are placed a certain distance apart and exert equal-and-opposite forces F on one another. Now one of the charge is doubled to magnitude 2Q. what happens to the magnitude of the force each charge experiences?

F = k (Q) (Q) /r^2

k (Q) (2Q) /r^2 = 2F – Coulomb’s law is applied both charges