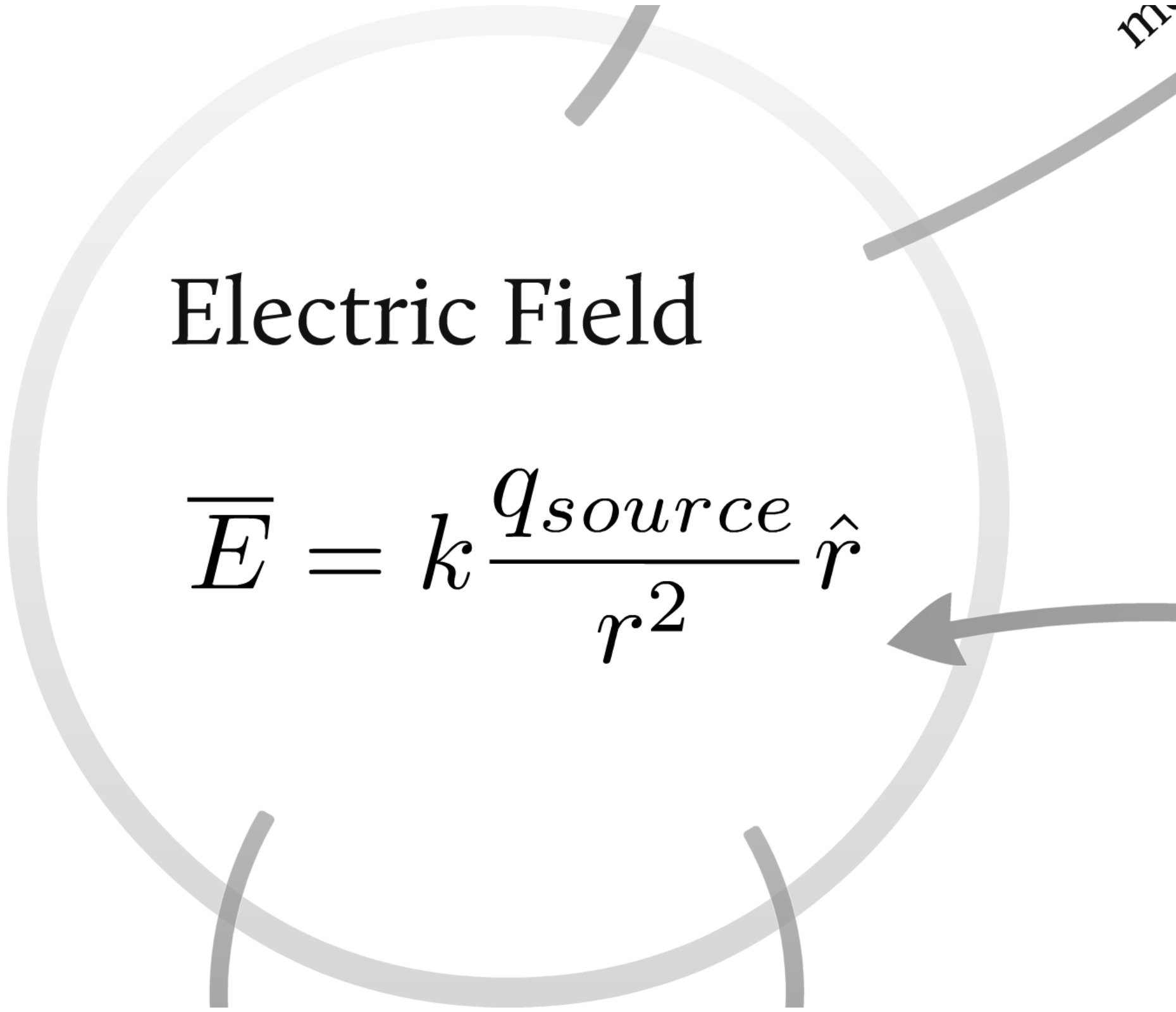


Electric Field

$$\overline{E} = k \frac{q_{source}}{r^2} \hat{r}$$



Operational Definition

test charge in pocket:)

attach test charge to pendulum
measure deflection to determine force

this is how we figure out lots of
mysterious field things. Same
methodology applies to gravitational
and magnetic fields.



same problem for gravity

philosophic problem

Our force laws - Newton's Law of Gravity, Coulomb's Law, Magnetic Forces - all apparently act instantaneously over infinite distance. This seems surprising (magical) and different than our human experience

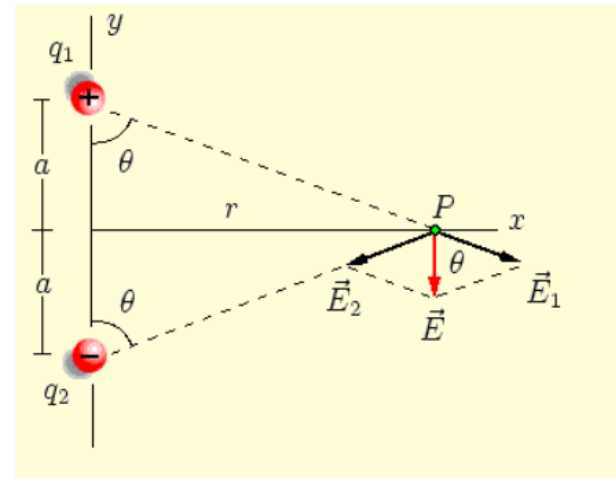
Michael Faraday is credited with creating the concept of a field that charges are responding to. This field exists everywhere and therefore the force is a local effect between the charge and the field. We don't have a great sense of this field or what it means to say it exists but it has proven to be a tremendously useful concept.

action at a distance

Superposition

interaction is independent
of other charges

allows solution of
multicharge problems



do a vector sketch and use those
component skills



abstract representation of E field

Field line model

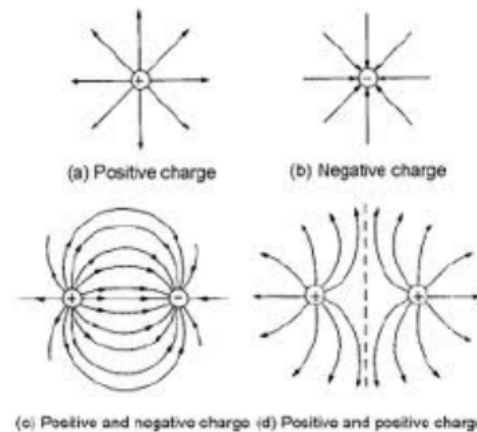
E tangent to field line

E greater where lines closer together

lines point away from + /towards -

lines originate on + and terminate on -

lines representing total E don't cross



standard fields to know

