### ELECTRIC FIELDS AND THEIR EFFECT ON MATTER

### Prof. Stephen Sekula 1/27/2011 Supplementary Material for PHY1308 (General Physics -Electricity and Magnetism)

1) What is the sign of the electric charge in this image?



3) Each of the charges shown in the image at the right has the same magnitude, |q|=1.0C. What is the total charge represented by these two particles, including the sign of their total charge?

2) A positive charge is placed at location P. In what direction does it move?



## ANNOLINCEMENTS

- Homework 1:
  - Due next Monday by 8pm
    - Use courses.smu.edu to submit, if possible
- TA-led help sessions/office hours
  - Farley Ferrante: FS60
    - Thursday: 6-8pm
  - Jessica Ginsberg: FS157
    - Wednesday: 6-7pm
    - Saturday: 6-7pm



# ASSIGNMENTS: 10 MIN.

- Teams Red and Yellow:
  - Calculate the electric field of the POSITIVE charge at point P
- Team Blue and Green
  - Calculate the electric field of the NEGATIVE charge at point P
- Teams Purple and Tan
  - Calculate the electric field of the POSITIVE charge at point O
- Team Orange
  - Calculate the electric field of the NEGATIVE charge at point O

### ANSWERS

 Electric field on perpendicular bisector:

$$\vec{E}_{\text{bisector}} = -\frac{2kqa}{(a^2 + y^2)^{3/2}} \,\hat{i} \rightarrow -\frac{2kqa}{y^3} \,\hat{i} \quad (\text{when y} >>a)$$

• Electric field on axis of dipole:

$$\vec{E}_{axis} = -kq \left| \frac{1}{(x+a)^2} - \frac{1}{(x-a)^2} \right| \hat{i} \to \frac{4kqa}{x^3} \quad (\text{when } x >> a)$$





