Electrophorus

A start toward capacitors.

Hollywood Example

- Christmas Vacation

Coulomb's Law

- Floating Styrofoam cup.
- What is the charge of the VDG?
- $F = \frac{kq_1q_2}{d^2}$
- $k = 9x10^9 Nm^2/C^2$
- q=Charge (C)
- d=distance between charges (m)

$m = 0.004\,kg$

$g = 9.81\,m/s^2$

$k = 9 \times 10^9\,Nm^2/C^2$

$d = .20\,m$

$q =$

$$F_e = F_g$$

$$\frac{k q^2}{d^2} = mg$$

$$k q^2 = mgd^2$$

$$q^2 = \frac{mgd^2}{k}$$

$$q = \sqrt{\frac{mgd^2}{k}}$$

Current Versus Static

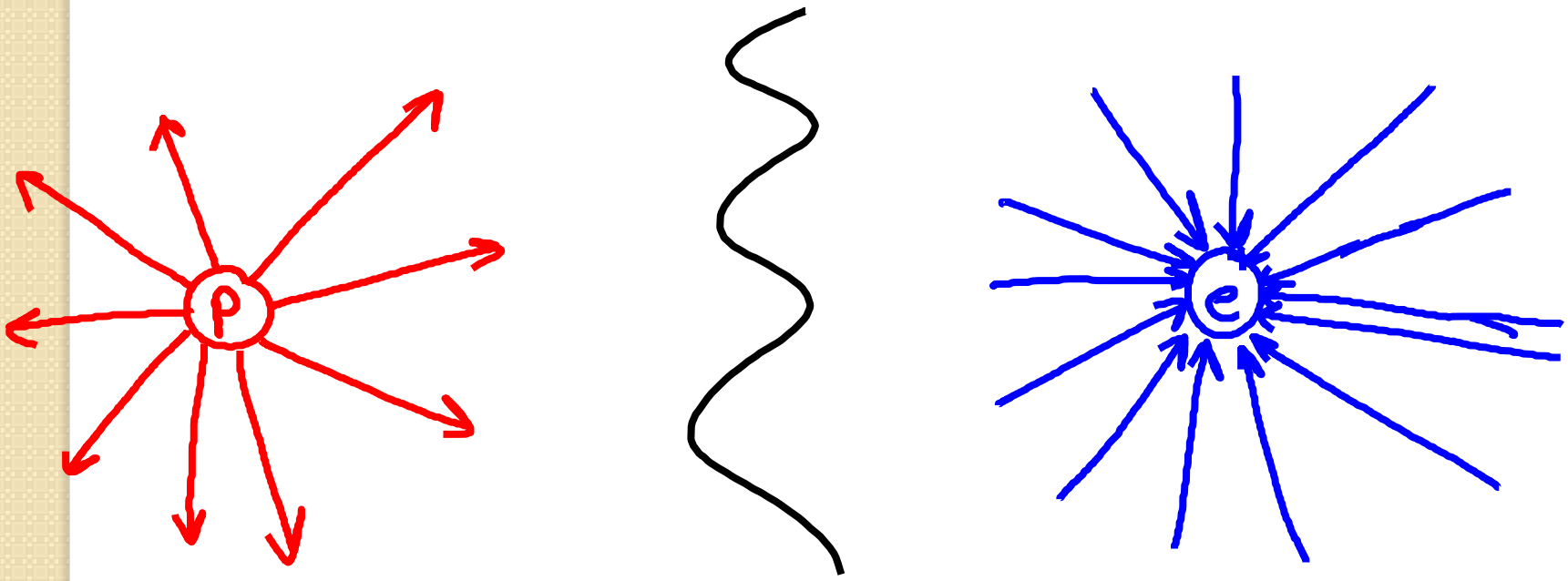
- 4.04E12 electron build up on the outside surface of VDG.
- 1 C = 6.2E18 electrons
- 1 Ampere = 1 C/1 s
- 20 Amps = 1.24E20 electrons/second
- Again it's not so much the charge that can kill you but the duration. One time zap is a lot safer than a continuous flow of electrons

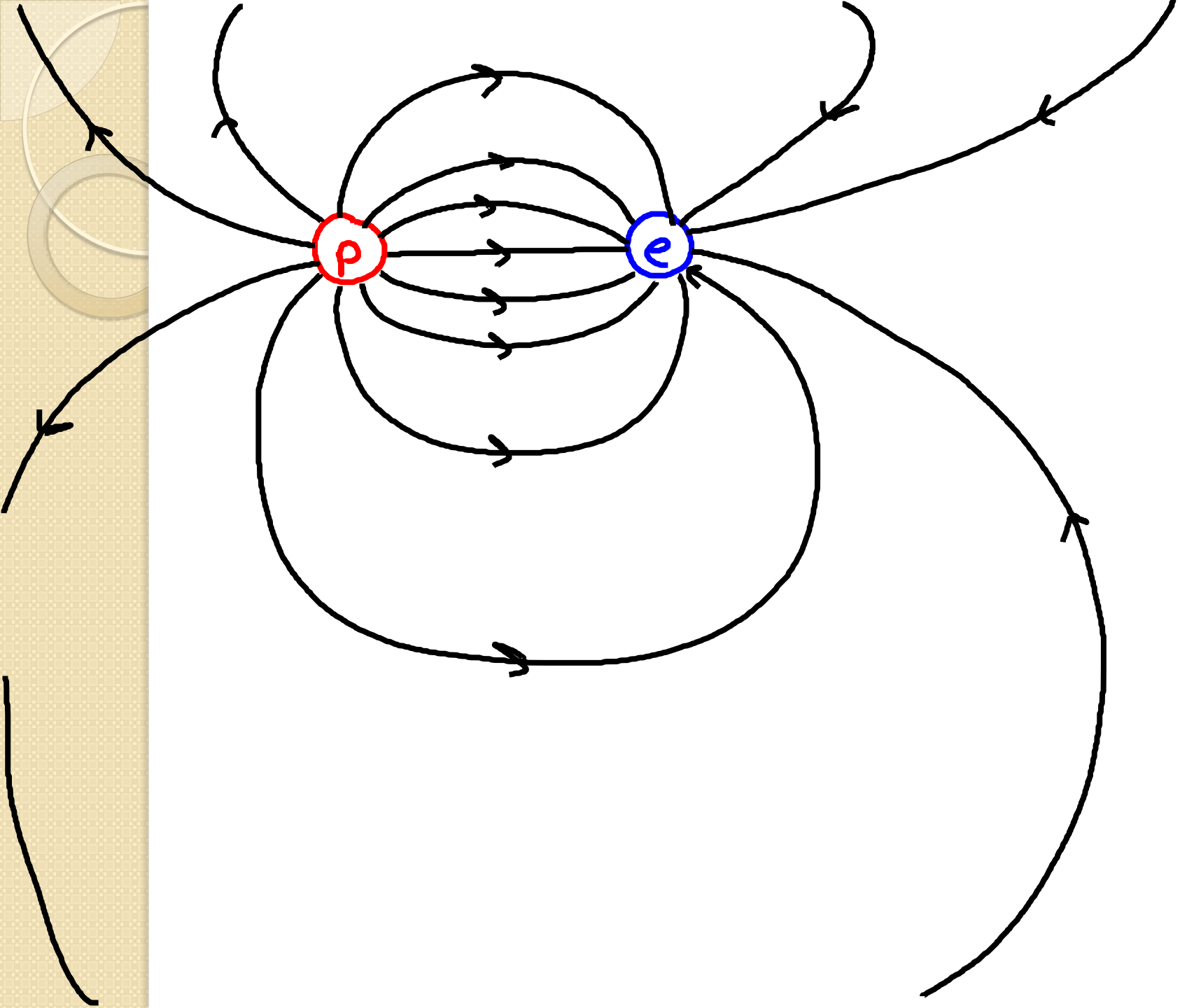
Demo: Charges try to get as far away from like charges as possible

- What looks like a wind flag for airports demonstrates how charges behave on conductors.

Electric Fields

- Like magnetic field lines but now it is because of charge.

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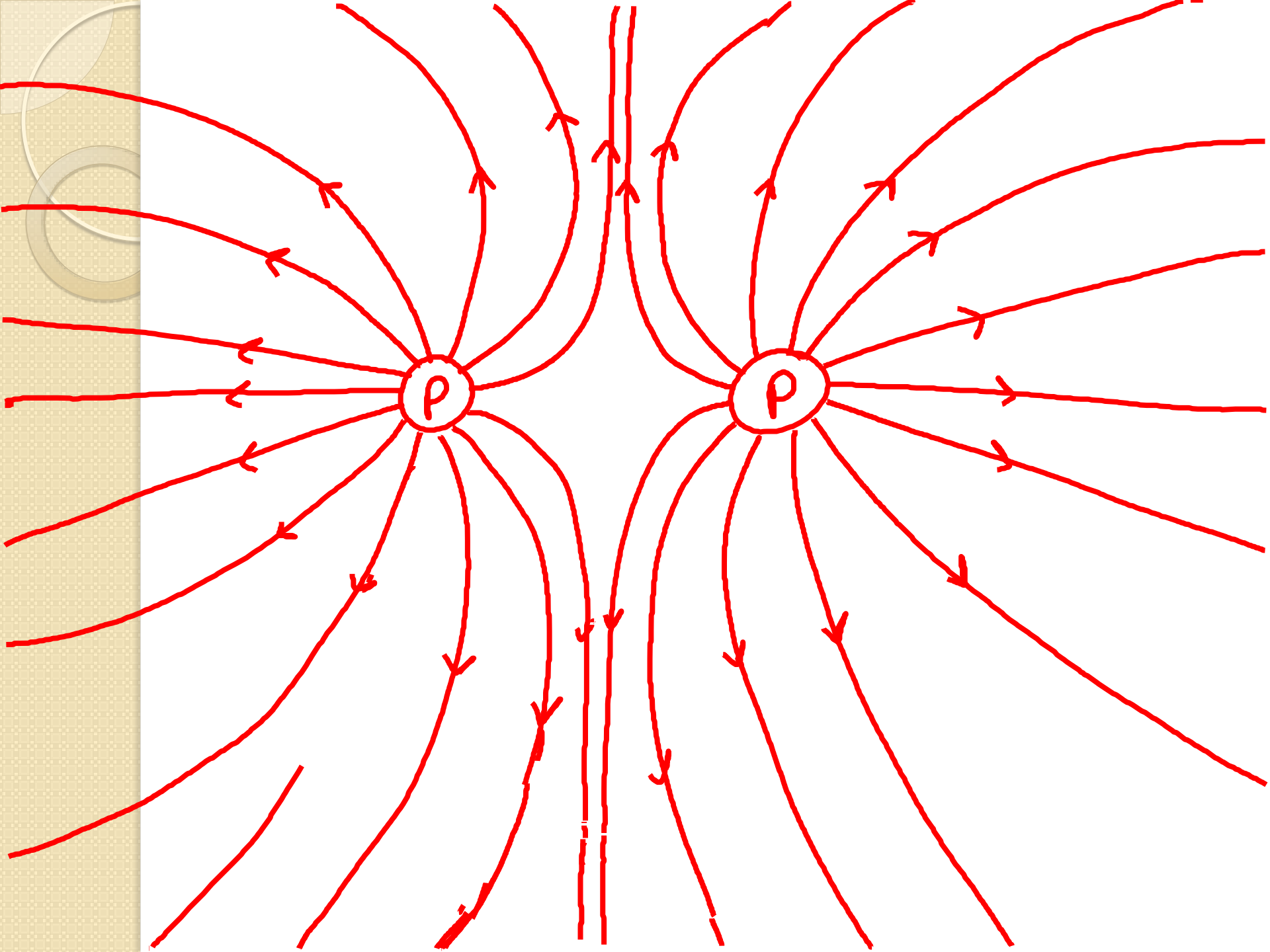
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Electric Field Extra Credit

- I was convinced to offer a chance for students to get extra credit and learn about electric fields at the same time.
- http://phet.colorado.edu/en/simulation/electric-hockey
- Worth 5 Points
- Level three goal = 5 Points
- Level two goal = 3 points
- Level one goal = 1 points

A problem using Coulomb's law

- A proton and electron are separated by 25 picometers (about actual size for an atom). What is the force between the two particles?

Coulomb's Law

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Electrostatics Study Sheet

- Problems 1-3, and back side of sheet.

Electrophorus

- Invented in 1762 by Johan Wilcke.
- Improved and popularize by Alessandro Volta in 1775.
- A way to store charge and continuously use it to shock and build up charge.