List of Demos on Electric Field Lecture 2
Friday July 7

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1. Electrostatics kit
2. Small Van de Graaff Generator, lightning rod, electroscope, electric wind. pom poms, pointers.
3. Field lines using felt,oil, and 10 KV supply.
4. Smoke remover/electrostatic precipitator
5. Kelvin water drop generator

Robert Van de Graaff Generator (1931) Tuscaloosa, Alabama

http://chem.ch.huji.ac.il/~eugeniik/history/graaff

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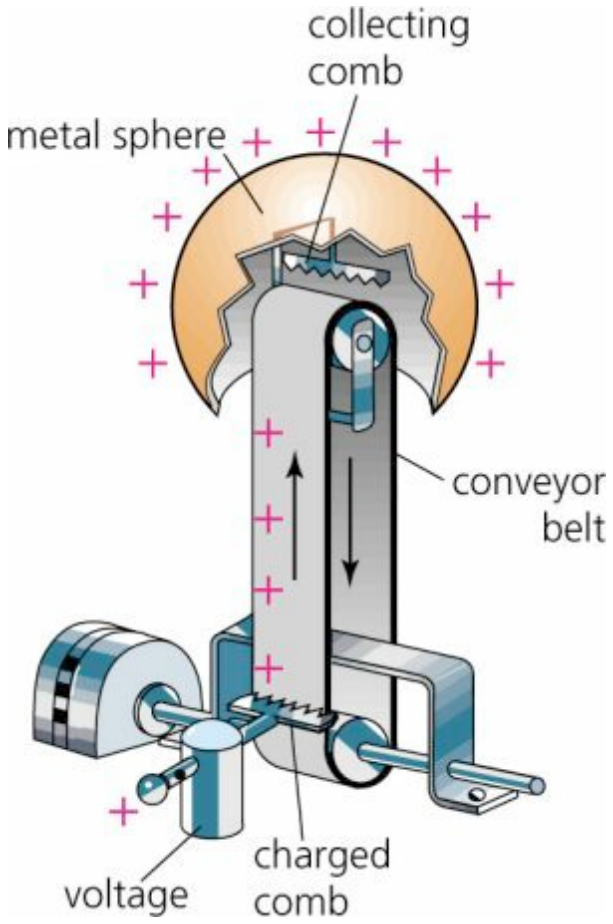
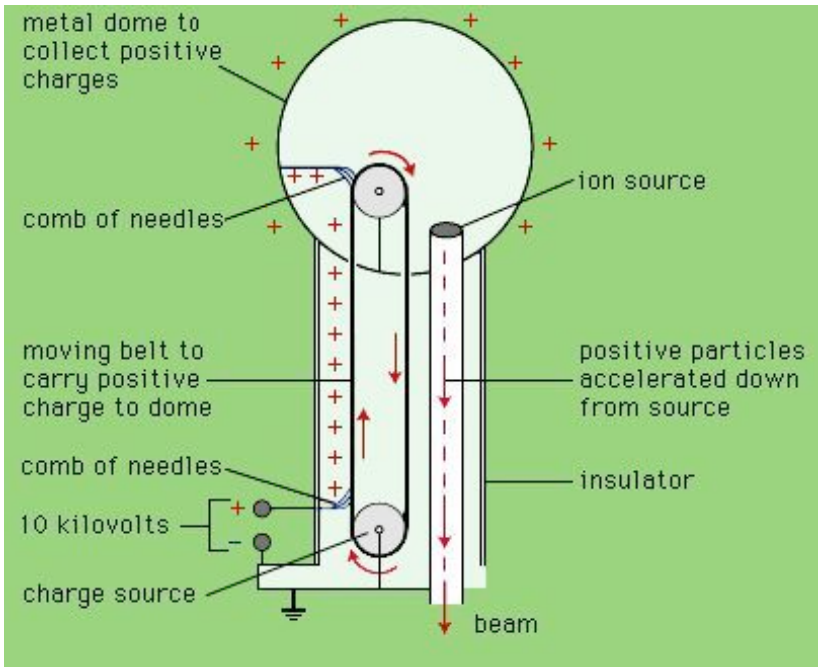


Van de Graaff Accelerator,



Electrostatic smoke precipitator model

Negatively charged central wire has electric field that varies as 1/r (strong electric field gradient). Field induces a dipole moment on the smoke particles. The positive end gets attracted more to the wire.

In the meantime a corona discharge is created. This just means that induced dipole moments in the air molecules cause them to be attracted towards the wire where they receive an electron and get repelled producing a cloud of ions around the wire.

When the smoke particle hits the wire it receives an electron and then is repelled to the side of the can where it sticks. However, it only has to enter the cloud of ions before it is repelled.

It would also work if the polarity of the wire is reversed

Kelvin Water Drop Generator

Am. J. Phys. 68,1084(2000)

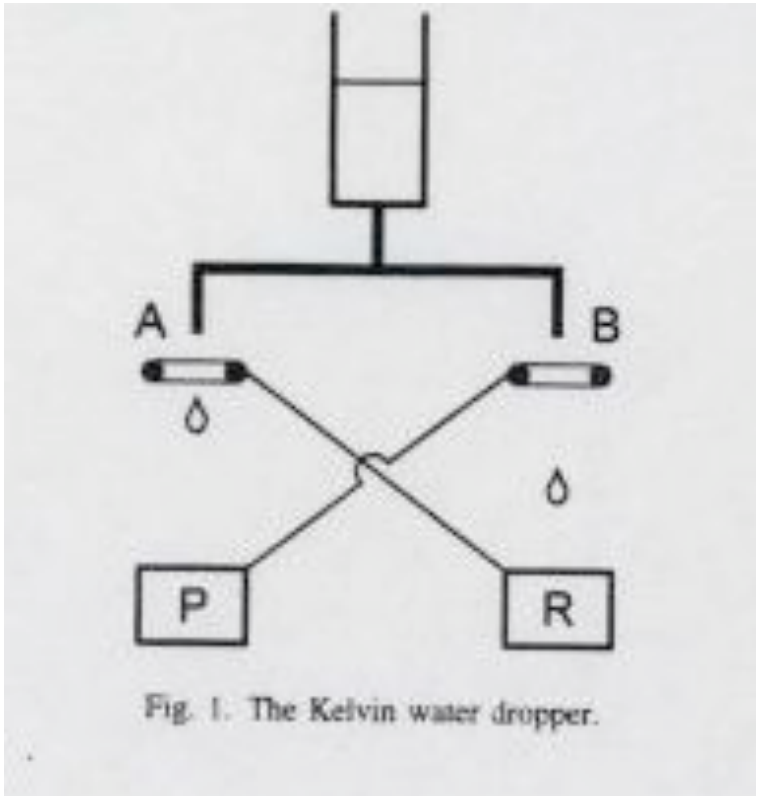
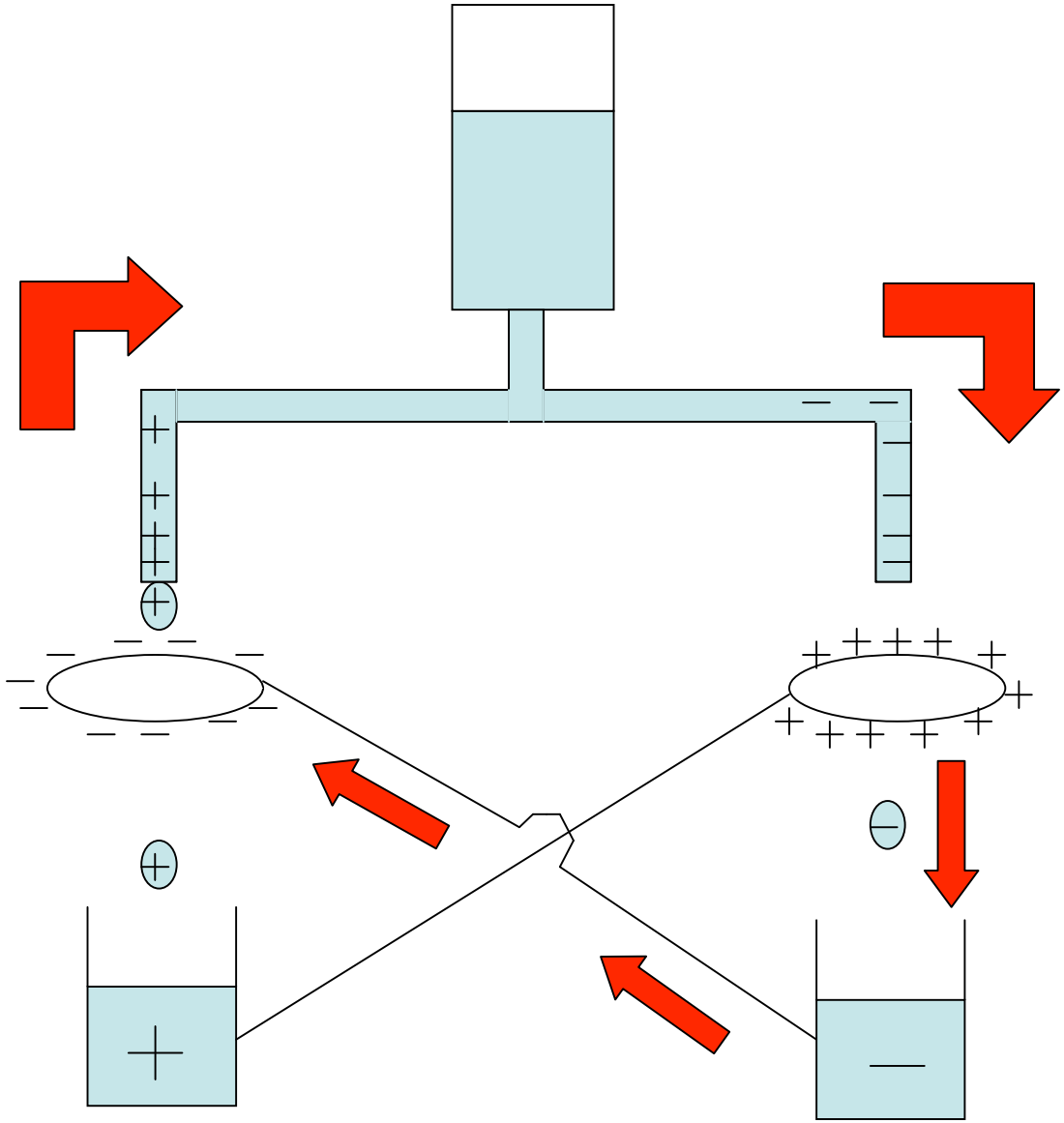


Fig. 1. The Kelvin water dropper.



Kelvin Water Drop Generator

Electrons follow red path as the rings and the cans become increasingly polarized through induction