

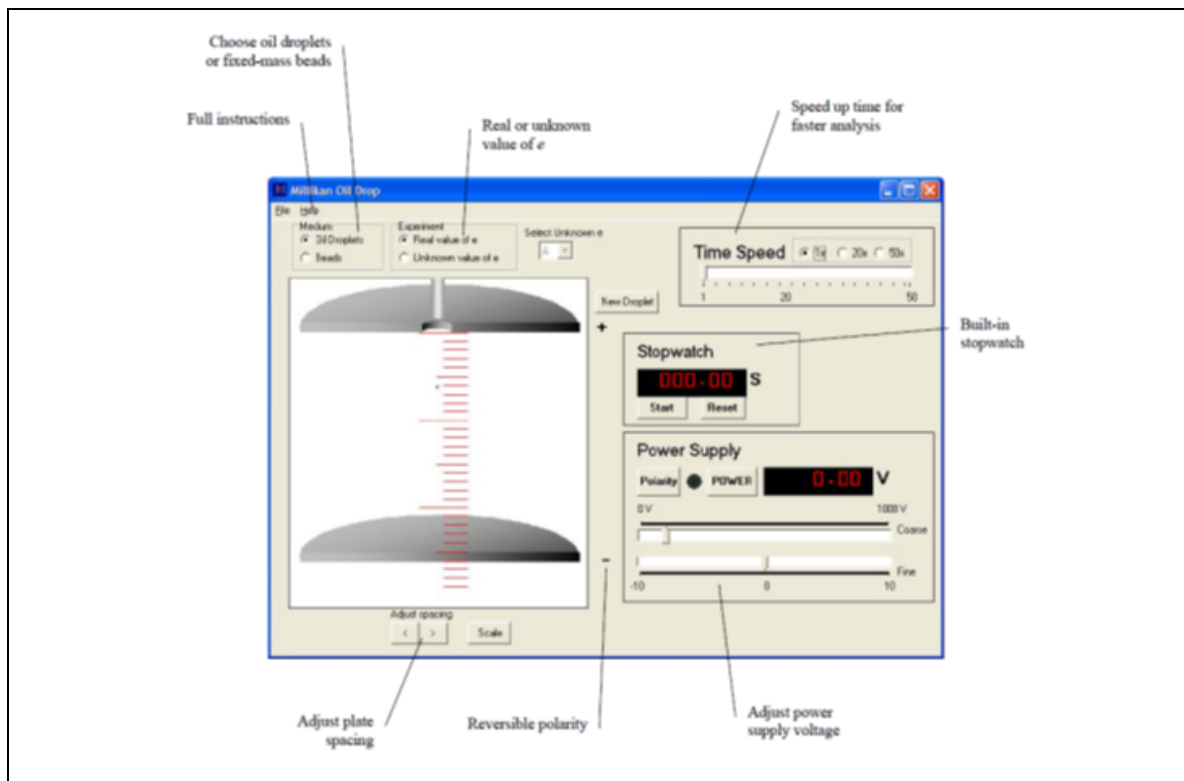
LAB 13.2 - Millikan's Oil Drop Simulation

<http://www.teachscience.net/2011/02/07/millikan-oil-drop-simulation/>

(can also be found on school network)

Aim

To use a computer simulation of Millikan's Oil Drop experiment to determine the charge on the electron.



Theory

If the mass of the oil drop is known (the fixed value of the oil bead in the simulation is $1 \times 10^{-15} \text{kg}$), then when it becomes suspended in the E-field, its weight is balanced by the electrostatic attraction,

$$qE = mg$$

As $E = V/d$, we get:

$$q = \frac{mgd}{V}$$

Method – Using a bead of oil of a fixed mass (easier)

Set the oil drop to “bead”. This fixes the mass of the bead to 1×10^{-15} kg. Therefore we can simply suspend the bead between the plates to determine the charge on the bead. Turn the power supply to the plates on – the voltage can be adjusted by both a coarse and a fine tune. It is help to run the time faster (use the buttons to the upper right of the screen) to determine that the bead has been completely suspended. Use the equation in the theory section above to calculate the charge on the oil drop. Repeat this at least 10 times. Either use the known value of e to plot a scatter graph of number of electrons v charge or an analysis of the lowest common denominator to determine a value for e .