# DIY Capacitor Project

## Objective

The goal of this project is to gain a solid understanding of how capacitors are constructed and how their capacitance is calculated. Additionally, the time varying nature of capacitors’ charge and discharge time is explored.

## Theory Overview

Capacitors are usually made of two conductive plates in parallel separated by a thin non-conductive material called a dielectric. The capacitance of a capacitor is directly proportional to the surface area of the conductive plates and the permittivity (or dielectric constant which is a measure of goodness or effectiveness) of the dielectric. The capacitance, on the other hand, is inversely proportional to the distance between the conductive plates; this distance is usually equal to the thickness of the dielectric material.

In the first part of this project, we will attempt to build a capacitor out of aluminum foil and saran wrap. In the second part, we will try to determine the “actual” capacitance of our capacitor by measuring the charge/discharge time.

Part 1: Building a Capacitor

Material needed:

* Aluminum foil
* Saran Wrap
* Paper tubes
* Scotch tape
* Two wire clips

Steps:

* Take one paper tube and draw a straight line along its length
* Place the tube with the straight line facing down on the table ~1” away from the edge of the table. Mark the spot with a piece of blue tape.
* Roll the tube away from the edge for 4 complete rolls. (You should observe the straight line making one complete rotation four times.)
* Mark that spot on the table with a piece of blue tape.