

# ISIM Lab No. 4 Report: Concerning Humidity

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In this lab, I used a humidity-variable capacitor to measure the humidity of the room and the humidity of my breath.

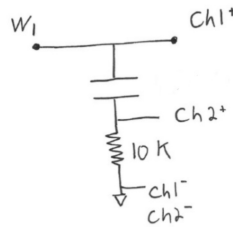


Figure 1: This is the circuit diagram I used to test the voltages across different capacitors with a 10k resistor. The capacitor shown was changed to a different value between 100pF and 220pF for each test.

Capacitance Value (pF)	Measured RMS Voltage Amplitude (Calibration)	Measured RMS Voltage Amplitude for Room Humidity	Measured RMS Voltage Amplitude for Breath Humidity
100	0.0881		
120	0.096		
150	0.1095		
180	0.1212		
220	0.1368		
175.59		0.11914	
183.06			0.12219

Figure 2: The results of the aforementioned test can be seen in the first 5 lines of this table. The line of best fit for the sample values was used to calculate the capacitances in yellow.

### Measured RMS Voltage Amplitude vs. Capacitance Value (pF)

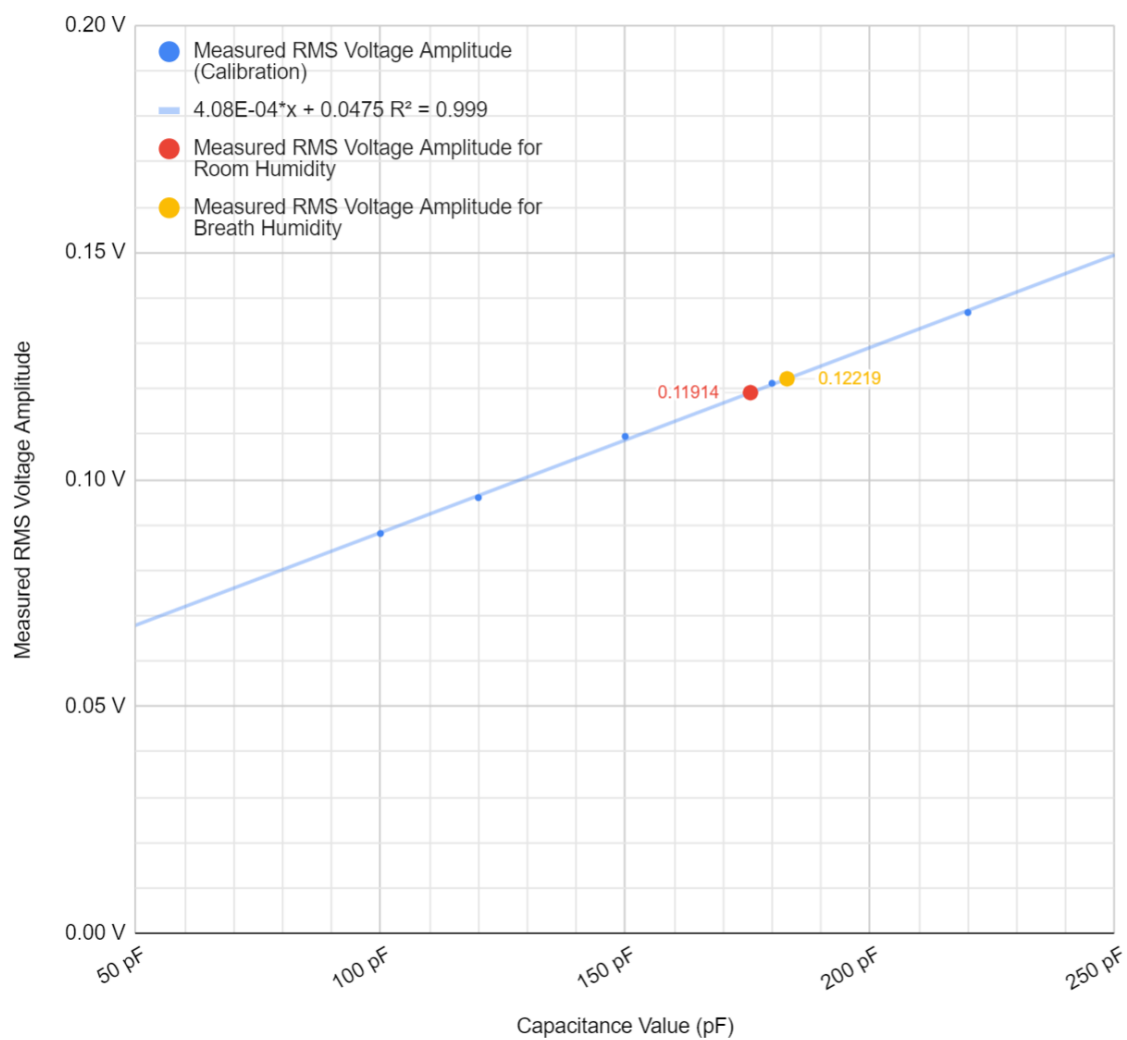


Figure 3: The values from the table in Figure 2 are plotted here, along with the line of best fit for the calibration values:  $4.08e04C + 0.0475 = V$  with and  $R^2$  of 0.999, meaning that the points form a line very well

Measured and Given RH (%) vs. Capacitance Value (pF)

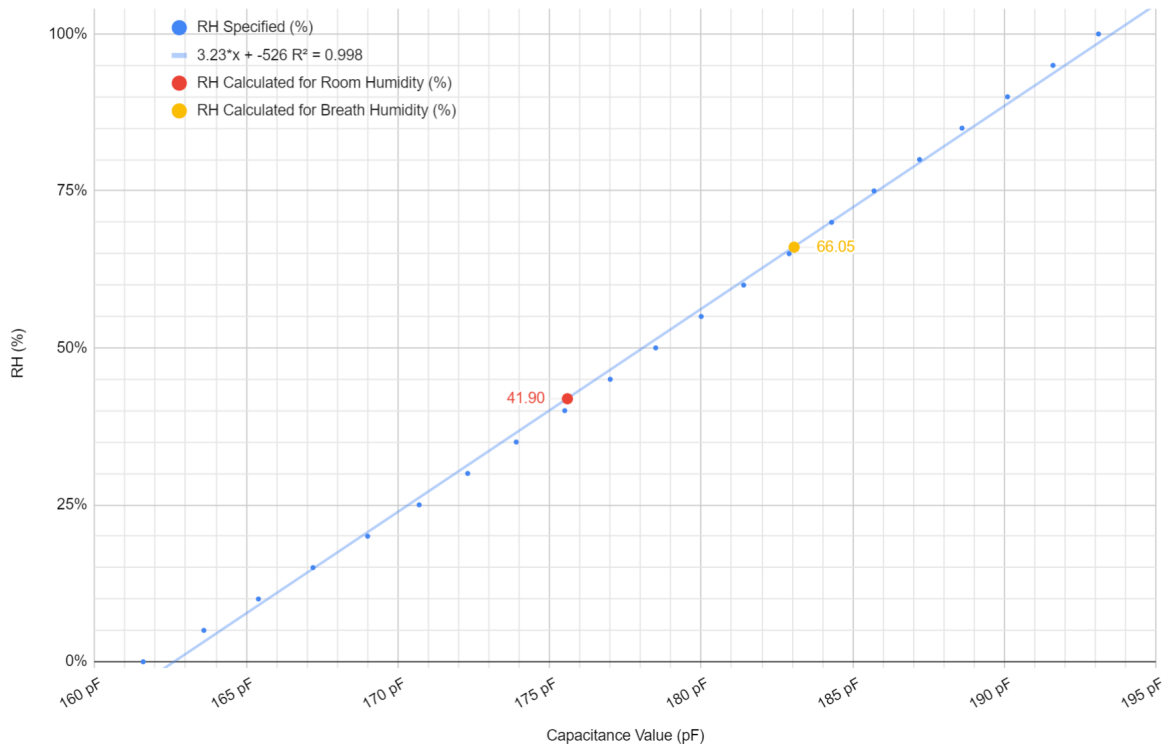


Figure 4: To determine the humidity from the capacitances, I graphed the values specified by the manufacturer in their look-up table and fit another line:  $3.23C - 526 = \text{Humidity}$ . I found that the room humidity was 42 percent and the humidity of my breath was 66 percent. The outside humidity on the day I measured was about 50 percent, so an indoor humidity (where the heater was running) of 42 percent seems reasonable.