

### Testing: 2/28

- In today's testing session, we will be focusing on testing out the transformer to make sure it is outputting an appropriate voltage and frequency.
- The output voltage is dependent on a load for the transformer. For all tests, we have an input voltage of 0.25 Vrms
  - 1 MΩ resistor: Output voltage: 7.3 V
  - Two 1 MΩ resistors in series: 7.7 V (Multiplication factor of ~ 30.96)
  - One 10 MΩ resistor: 7.99 V (Multiplication factor of ~ 32)
  - One 13 MΩ resistor: 8.02 V (~32x)
- New test: Want to run current through the copper plate and see if it heats up (connected to 10MΩ resistor)
  - Result: Copper did not get hot at 0.25 Vrms.
- Now increasing input voltage:
  - $V_{in} = 1.25V \rightarrow V_{out} = 46 V$  (~37x)
  - $V_{in} = 2V \rightarrow V_{out} = 77 V$
- Question: Why is the higher voltage input leading to an increased multiplied output??
- Ordering 8x4 sheet of styrofoam that is 1 inch thick (this will be used as our base).
- Need to figure out spacing between RF electrodes
  - Scale up from functional trap
  - Talk to Gavin

### Testing: 3/18

- Just received the styrofoam board.
  - We cut it up to use as a base for our trap
- We will test out different distances in between the plates.
- We ended up soldering two 22MΩ resistors in parallel (11 MΩ series) for a higher load.
- Utilizing crimps to extend wires and split them to alligator clips
- Tested at highest voltage (140 on the Variac)
  - Result: No heat issues but also no movement...
- The spacing and levelness of the plates was not very precise so we did not expect anything to really happen today.
- Overall, the system did not get hot at all. Tried to drop styrofoam above the trap, but nothing happened...

- Will try to be more specific about the levelness and spacing next testing session.

### Testing 3/25

- We decided we wanted to have the loads connected to both sides of the loop.
  - Replacing the two 11M $\Omega$  resistors and switching to two 5.5M $\Omega$  (2.25M $\Omega$  in series) resistors instead.
  - We are doing this because when measuring the voltage at the transformer across a singular copper plate, the results were not convincing that the transformer was producing enough voltage.
- The current was low, which is a good thing.
- After performing the switch, the results came out promising for accurate voltage on both sides of the copper plate.

### Testing 4/3

- Redesigned wire setup from the transformer by using Wago connectors.
- Went to the Boyd lab (in Hoover Hall) to get two new strips of copper (12x1")
- From Gavin's calculations, we have modified the spacing of the plates to 0.4" apart.
  - Haven't noticed anything different from prior testing
  - There is a little movement of the styrofoam on the plates but not a strong enough effect to suspend them entirely off the plates.
- We changed the base surface to wood instead of styrofoam.
  - We noticed much more movement using wood, especially underneath the wood when the styrofoam was on the table.
- Overall results ended up not improving from previous attempts.