

Test of FC electrical components

TB meeting
May 3, 2017

Animesh Chatterjee for
J. Yu, D. Zenger, M. Rapp & UTA Team

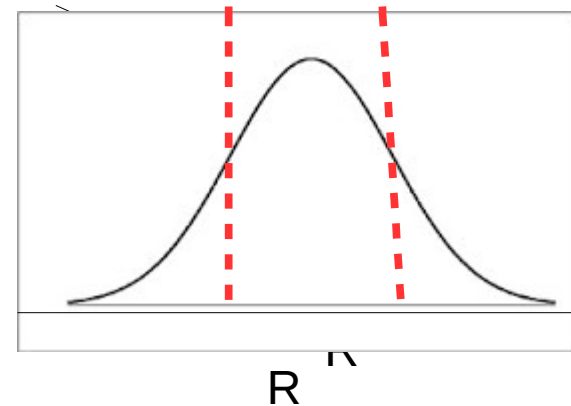
Testing of electrical components

Test the divider boards, resistors, and varistors both in warm and cold.

- **Testing plan**

Resistors :

- Measure the resistance from I-V curve both in warm and cold for each individual resistors, repeat the process 3 times.
- Test the resistors at a maximum voltage of 10 kV in 0.5kV steps
- Make a distribution of the resistance in cold and select the resistance as specified in the requirement.



Testing of electrical components

- **Varistors :**
 - Measure the resistance from I-V curve both in warm and cold for each individual resistors, repeat the process 3 times.
 - Measure the clamping voltage and select the proper one according to the requirements.
- **Divider Board:**
 - Test the bare board both in warm and in cold
 - Mount the resistors and varistors on the board in proficient manner.
 - Check assembled boards both in warm and in cold.
 - Apply minimum of 6 kV in each stage (60 kV total) and test in cold.

Production Status

Placed order for Resistors and varistors

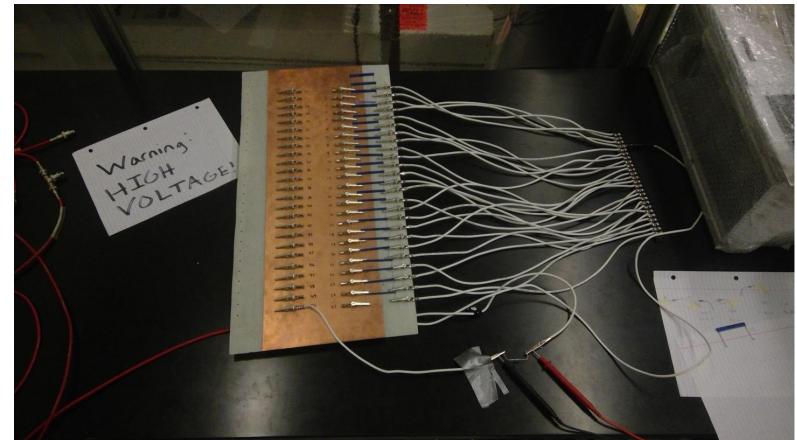
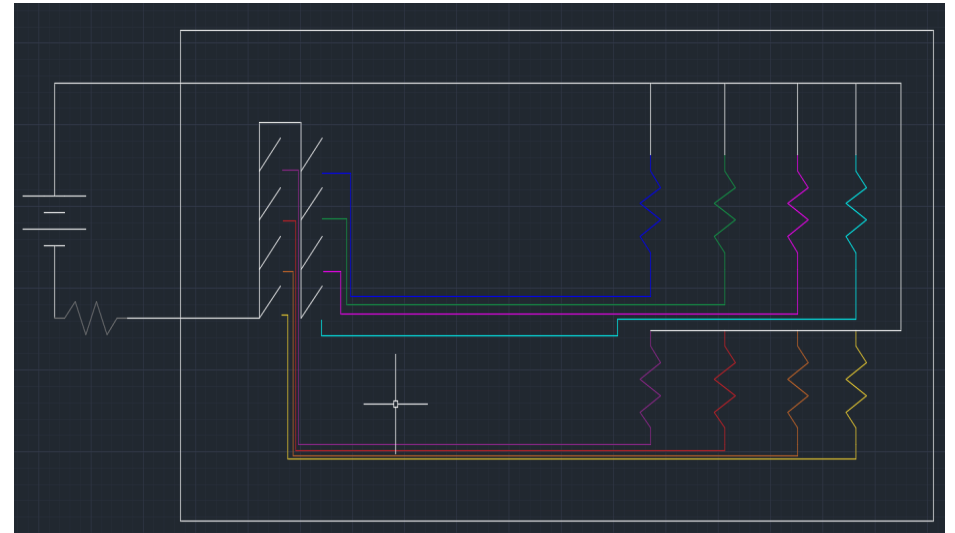
components	# required	# ordered	Lead time
Resistors	400	600	4-5 weeks(100 on hand)
Varistors	800	1000	on hand

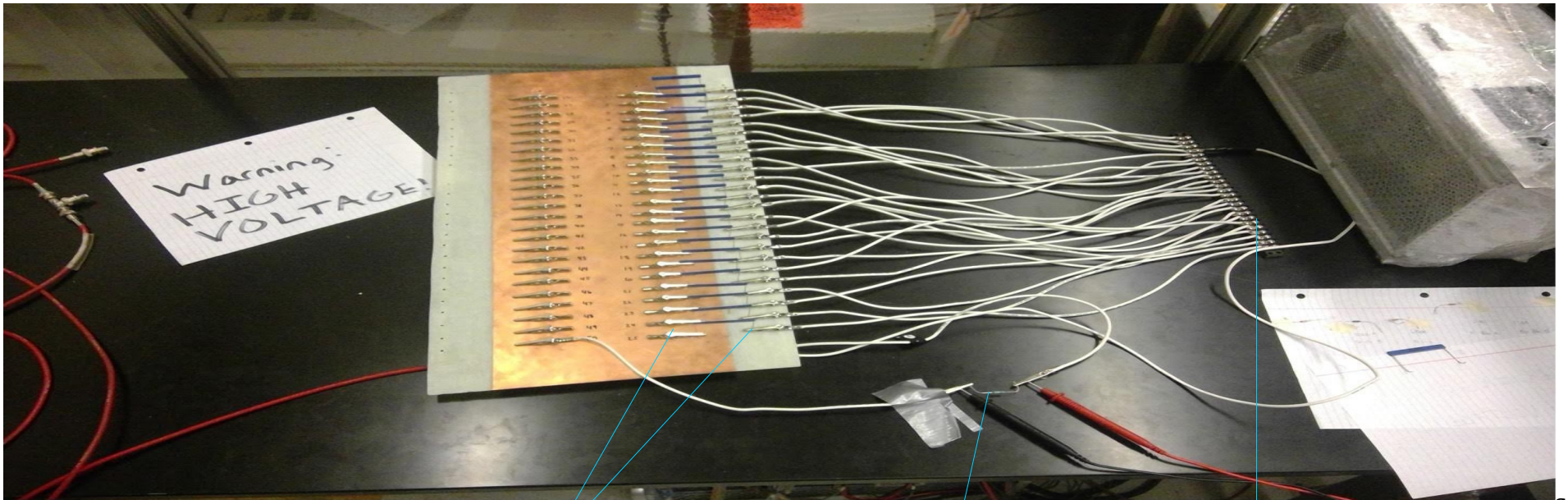
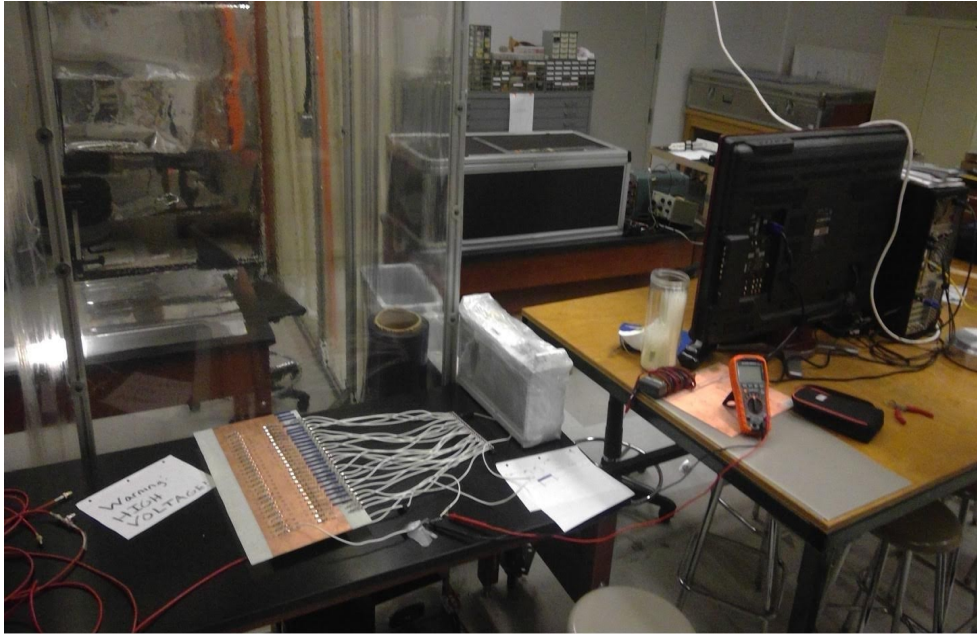


- Placed an order for divider board.
 - Lead time for bare board 3-4 weeks

Resistors test

- **Testing board** -
Undergraduate students working to design testing board and test all components.
 - 50 resistors mounted on the board.
 - Circuit diagram tested and verified.
 - Few resistors tested upto 5 kV in 0.5 kV steps.
 - Start testing resistors with 10 kV supply this week.
 - I-V characteristics plotted and resistance value measured and tolerance calculated.



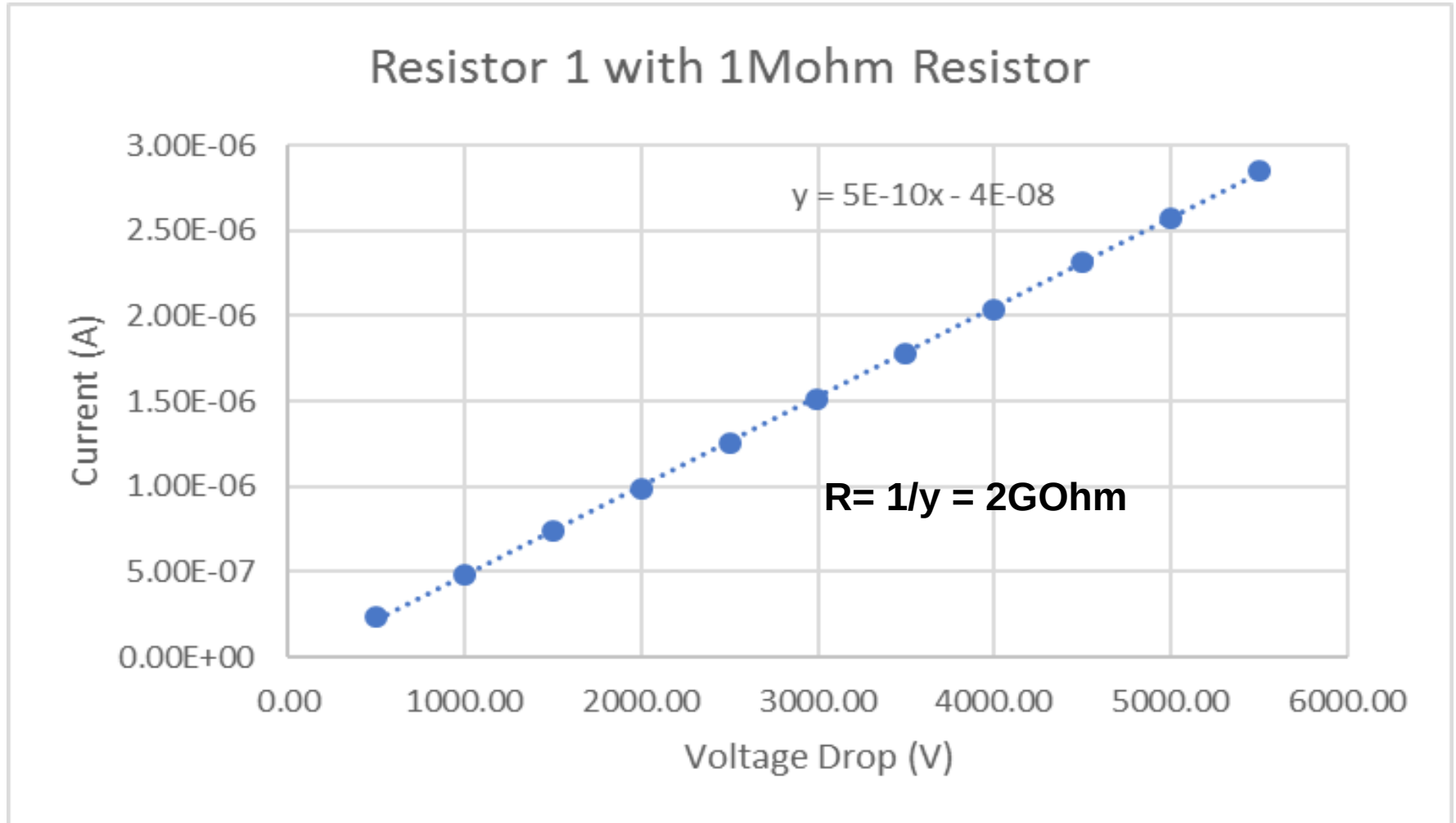


2 Gohm Resistors connected with alligator clip

1 Mohm resistor

switches

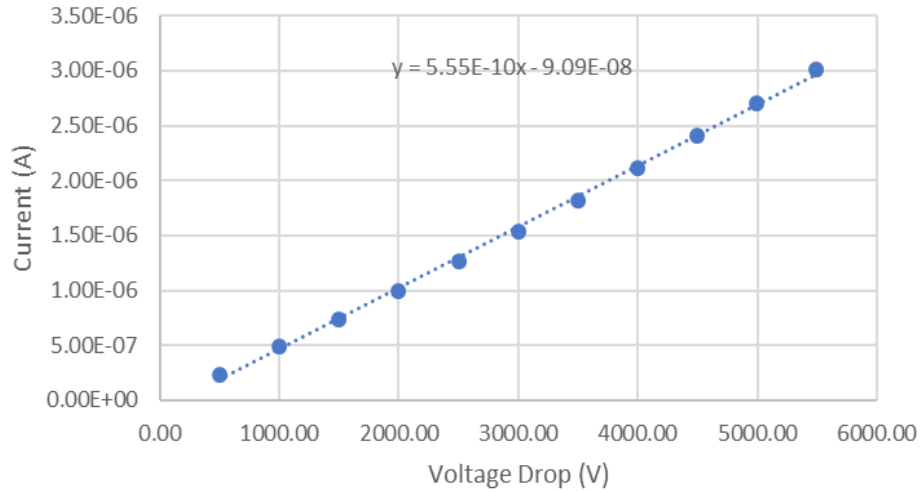
I-V Plot



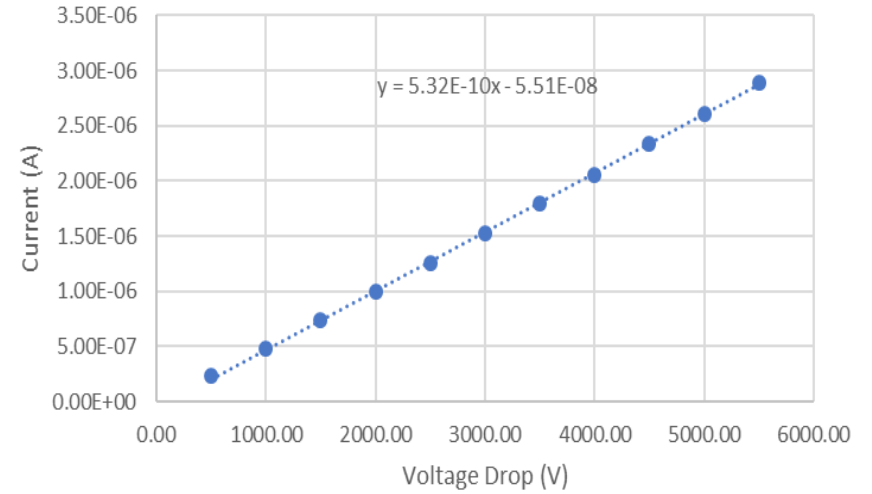
Repeat the measurement for 3 times, take the average value and calculate the tolerance

I-V Plot

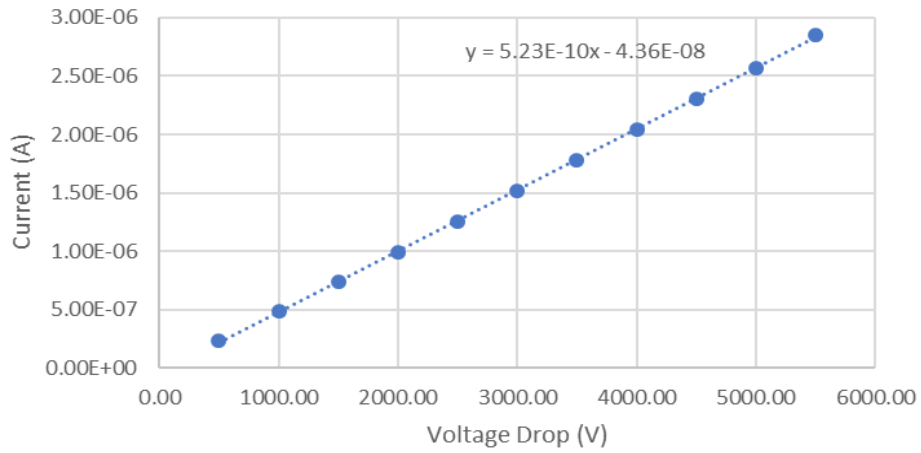
Resistor 1 Test 1



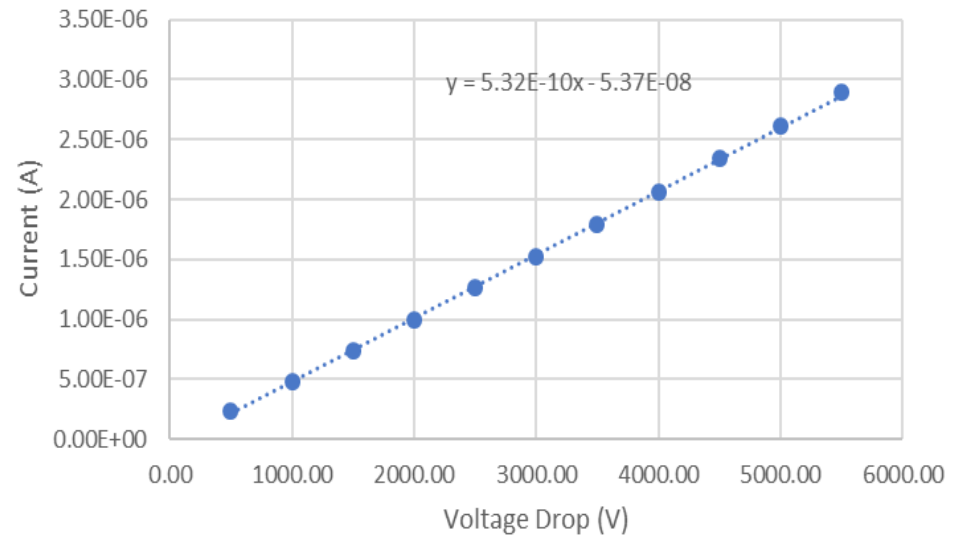
Resistor 1 Test 2



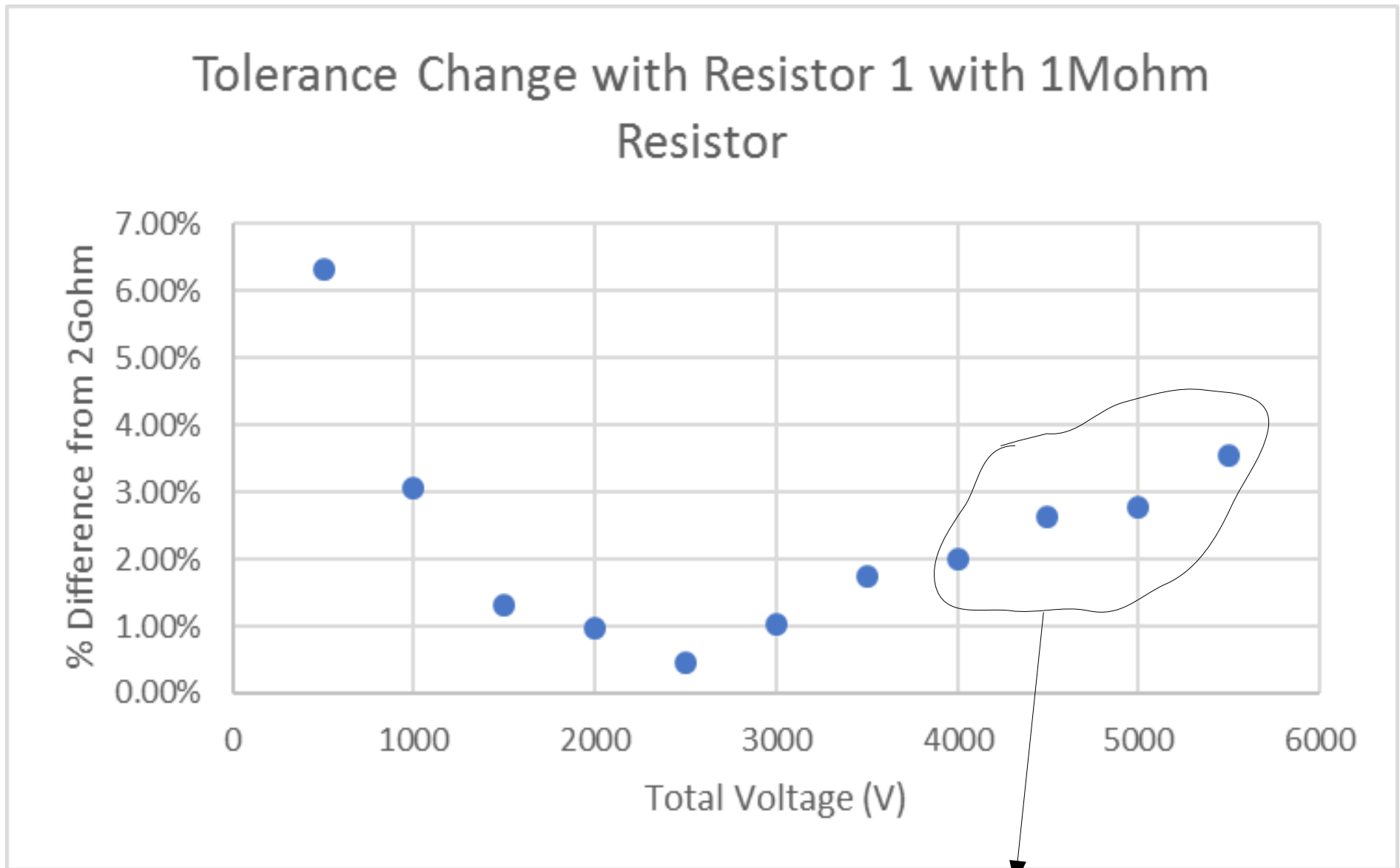
Resistor 1 Test 3



Resistor 2 Test 2



Resistance tolerance



Reason might be due to the limitation of the power supply voltage upto 5.6 kV, test the same with higher power supply.

Future plan

- Complete first setup of measurement (50 resistors) in warm with 10kV power supply.
- Measure the tolerance and select the proper one.
- Do the same in cold and test all the resistors.
- Mount the varistors and complete measurement.

Conclusion

- Testing board for the components designed and tested.
- Resistors testing is in progress.
- Start testing varistors
- HV Divider board order in place.