

# Life Time Studies & Resistance Measurements

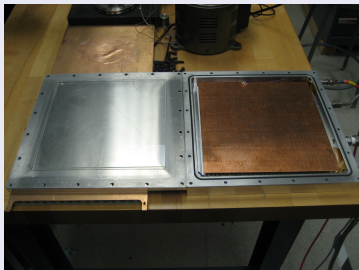
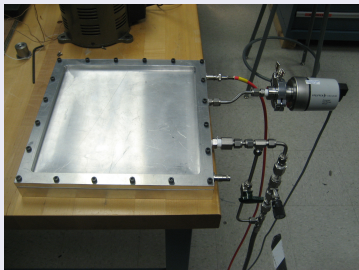
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April 5, 2013

LAPPD2 Microchannel Plate Godparent Review

# International Spacer Station (ISS)



## Original Motivation

- Measure the resistance of gridspacers with no electroding.

## Applications

- Whole stack can be measured.
- Resistance vs. Pressure.
- Resistance vs. Temperature.

## Design & Production

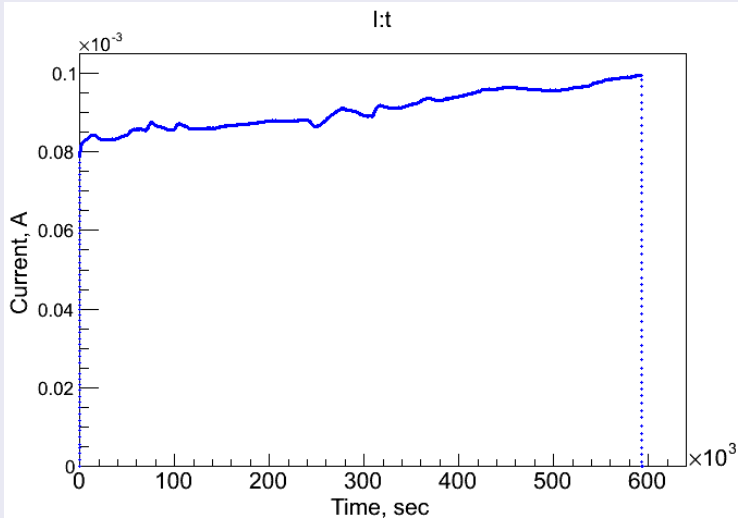
- Henry Frisch.
- Robert Metz.
- Richard Northrop.

## Pressure Control

- Jeffrey Williams.

# Resistance Drop in the Demountable

One week of continuous operation



# Demountable Components Measurements

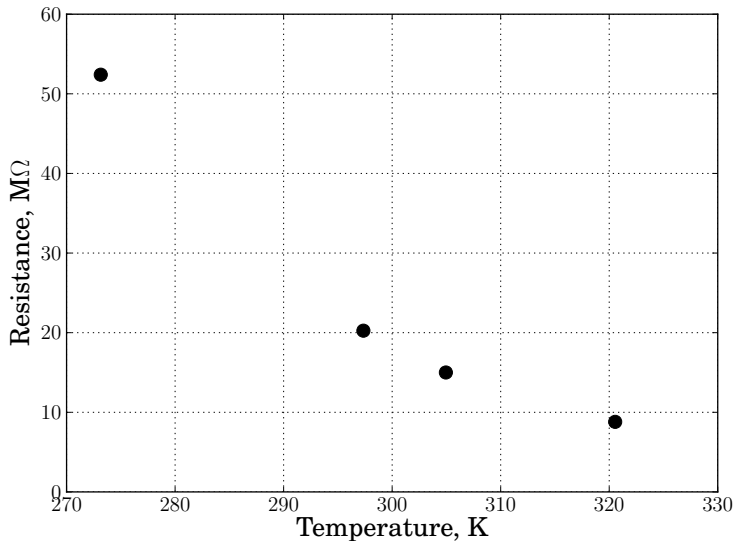
## Resistance, $M\Omega$

Component	October 27, 2012	February 17, 2013	Difference, %
Top GS	2.28	2.40	5
Top MCP	10.34	7.77	25
Middle GS	2.0	2.04	2
Bottom MCP	12.2	6.96	43
Bottom GS	4.5	4.89	9
Total	31.32	24.06	23
Full stack	32.2	24.3	24

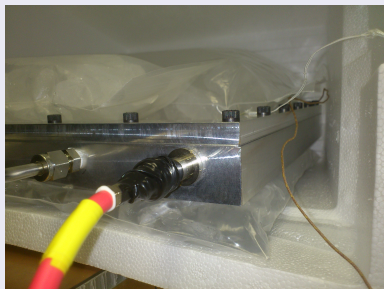
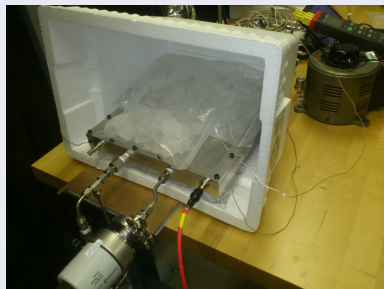
## Conclusion

- Resistance of the Demountable stack decreases when it operates.
- Resistance of MCPs decreases more rapidly compared to gridsacers.

# Demountable Resistance Dependence on Temperature



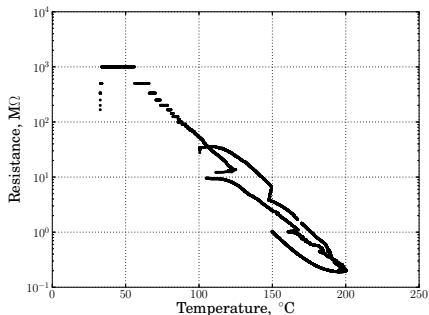
# Freezing Point Temperature Measurements



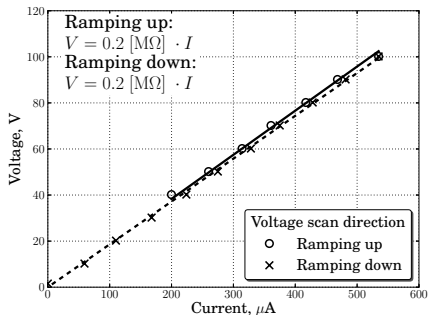
# MCP Resistance Dependence on Temperature

Anil Mane saw very low MCP resistance at 200°C for a long time.

## Resistance vs. Temperature



## Voltage vs. Current @ 200°C

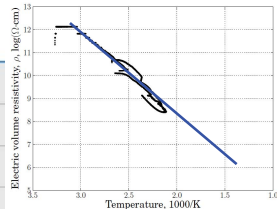
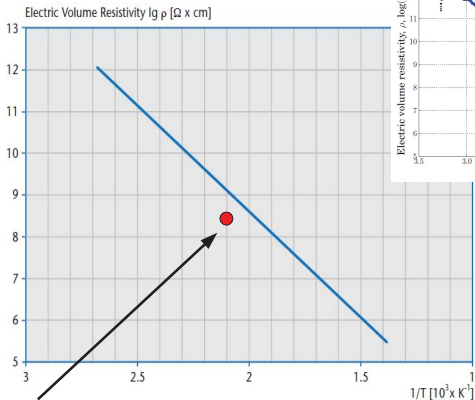


MCP is electroded, but without ALD, is made from C-5 glass.

# Comparison of B33 Glass and C-5 MCP Properties

Andrey Elagin's talk on March 5, 2013

B33 known data from Michael



ISS point: 200KOhm @ 200C for 1.2mm plate with 60% open area and 8 degree bias



## Demountable Life Time Studies

- Whole stack resistance decreases by 15% for one week of continuous operation.
- Main contribution to the resistance drop provided by MCPs.
  - Resistance decreases by up to 43% for four month of occasional operation.

## Resistance Dependence on Temperature

- Whole stack resistance drops when temperature is rising.
- Single MCP behavior is similar: very low resistance at high temperature.
- This property is similar to the glass without pores.
  - Comparison with B33 glass was made due to lack of data for C-5.
- C-5 glass plates with no pores were received on April 2, 2013 to repeat the measurements.