



# **The Effects of High Pressure on PT-1000s**

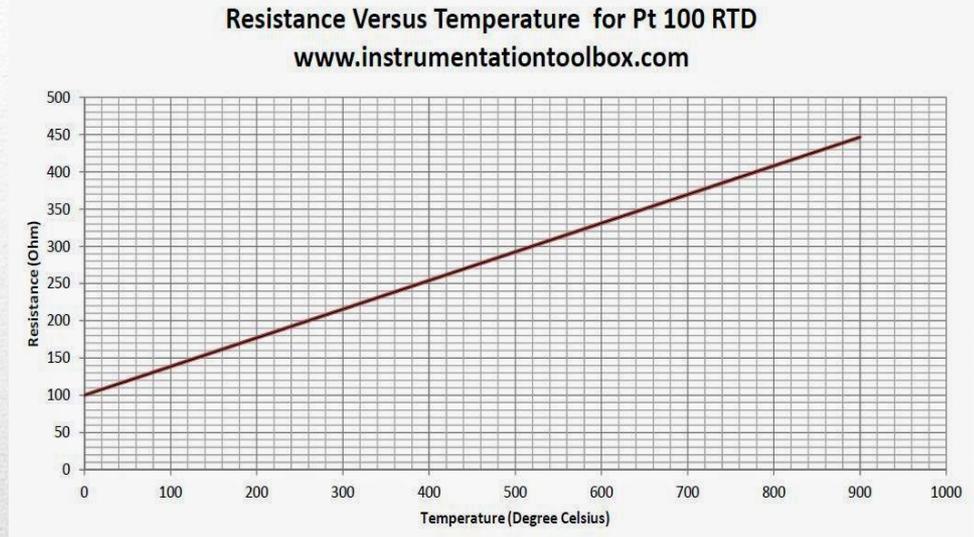
Abby Lindsay

Mentor – Henning Back

# MY GOAL

This summer I tested the resistance of a PT-1000 in a variety of temperatures and pressures to determine why the PT-1000 doesn't accurately measure the temperature and the liquid levels in the Condenser Booster.

- Resistance Temperature Detector (RTD)
- Platinum resistor where the resistance is a well known function of time.

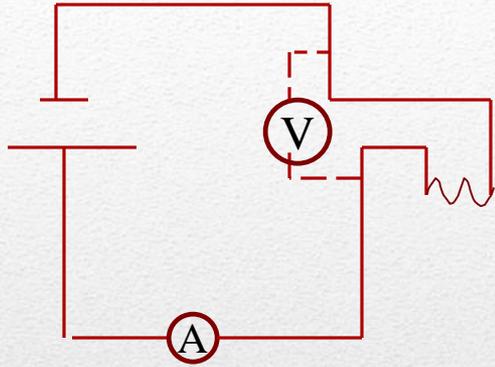


# The PT-1000

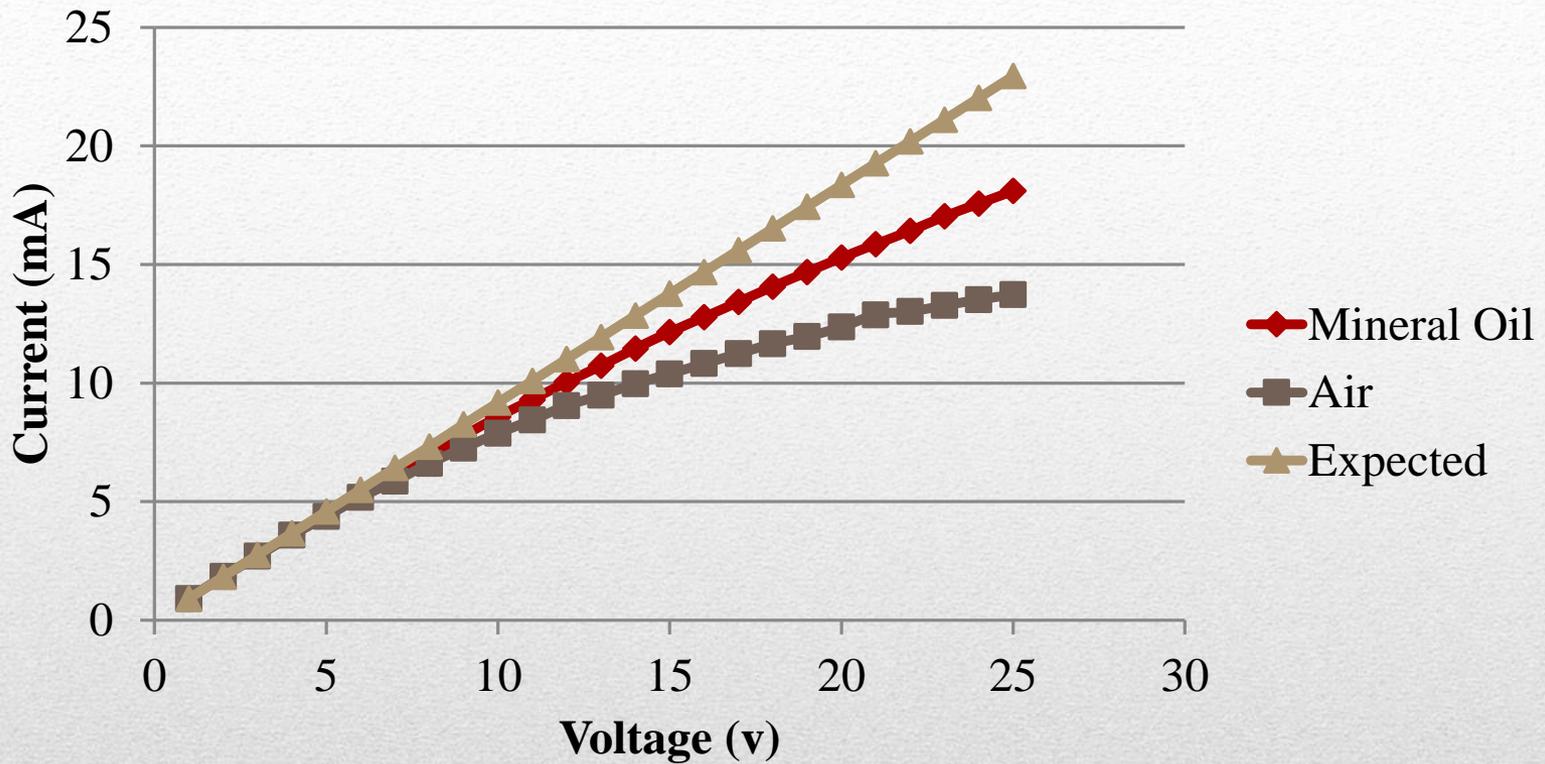
- $V=IR$
- V – Voltage
- I – Current
- R – Resistance

# Ohm's Law

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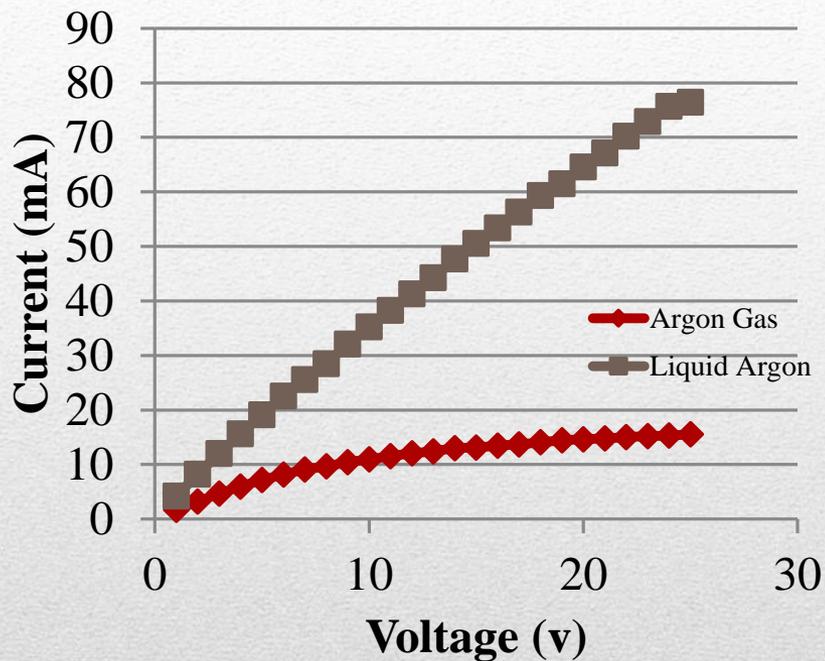


# Experiment Setup

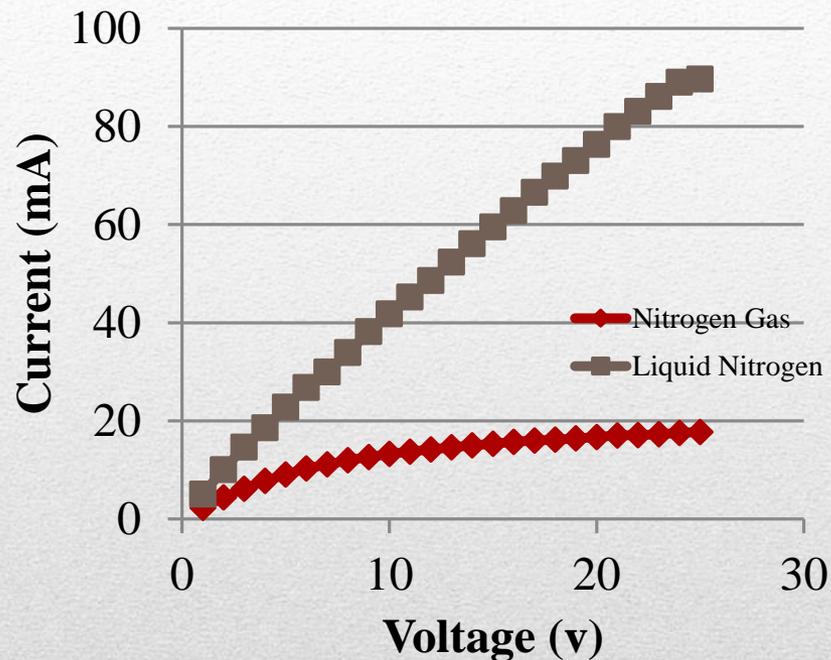


# PT-1000 Reaction in Gas and Liquid (Room Temp)

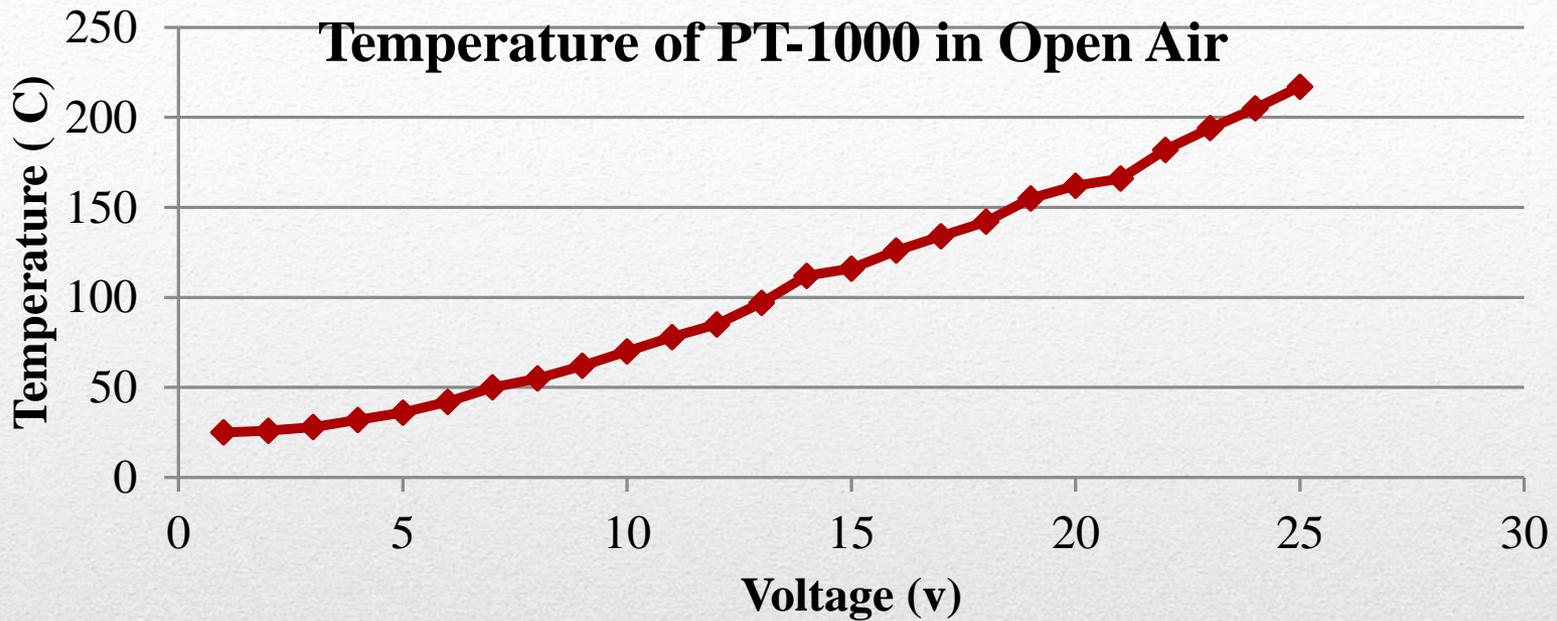
## Argon



## Nitrogen

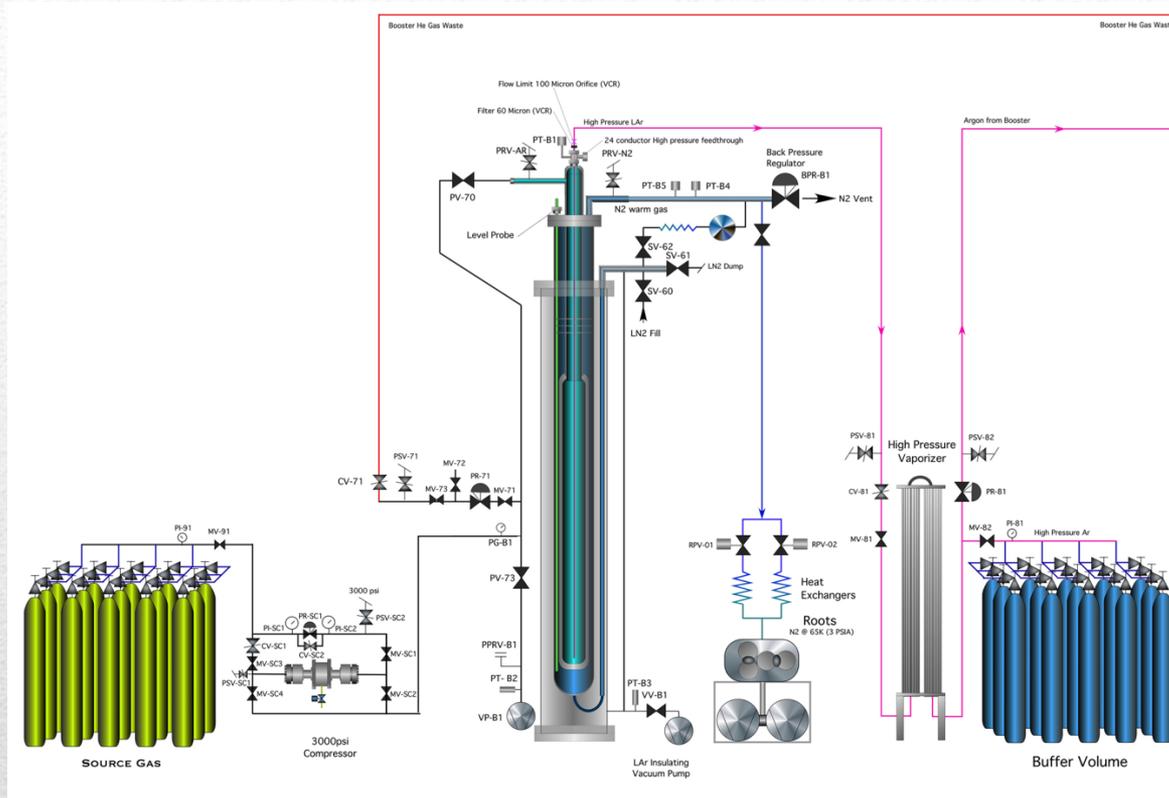


# PT-1000 Reaction in Cryogenic Gas and Liquid



Self Heating!

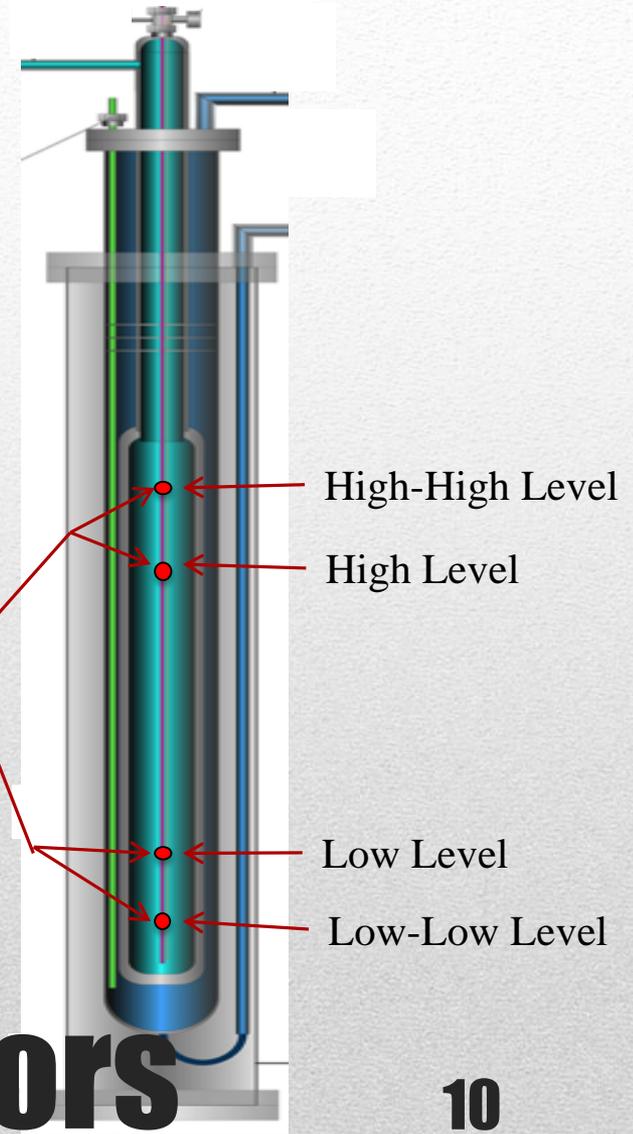
# Why does Resistance Change from Expected?



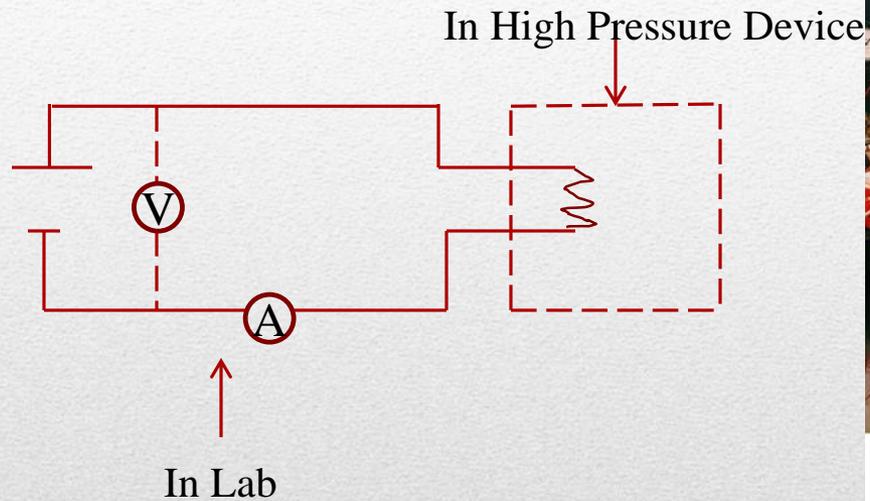
# How PT-1000 is used at DarkSide

- PT1000s used as liquid level monitor in CB
- 4 monitors used
  - 2 for High liquid level
  - 2 for Low liquid level
- Maintain liquid level between Hi and Low levels

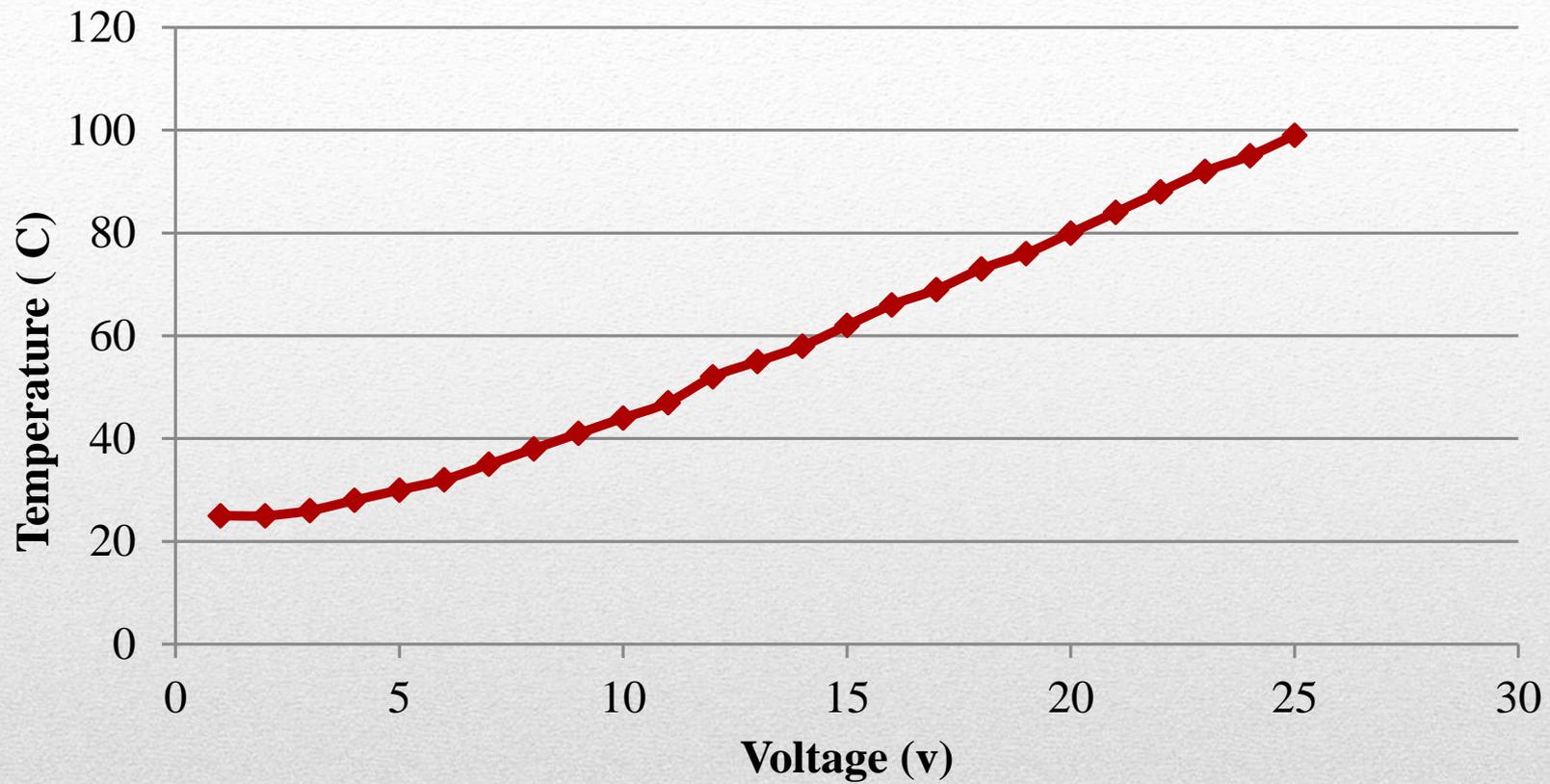
PT-1000s



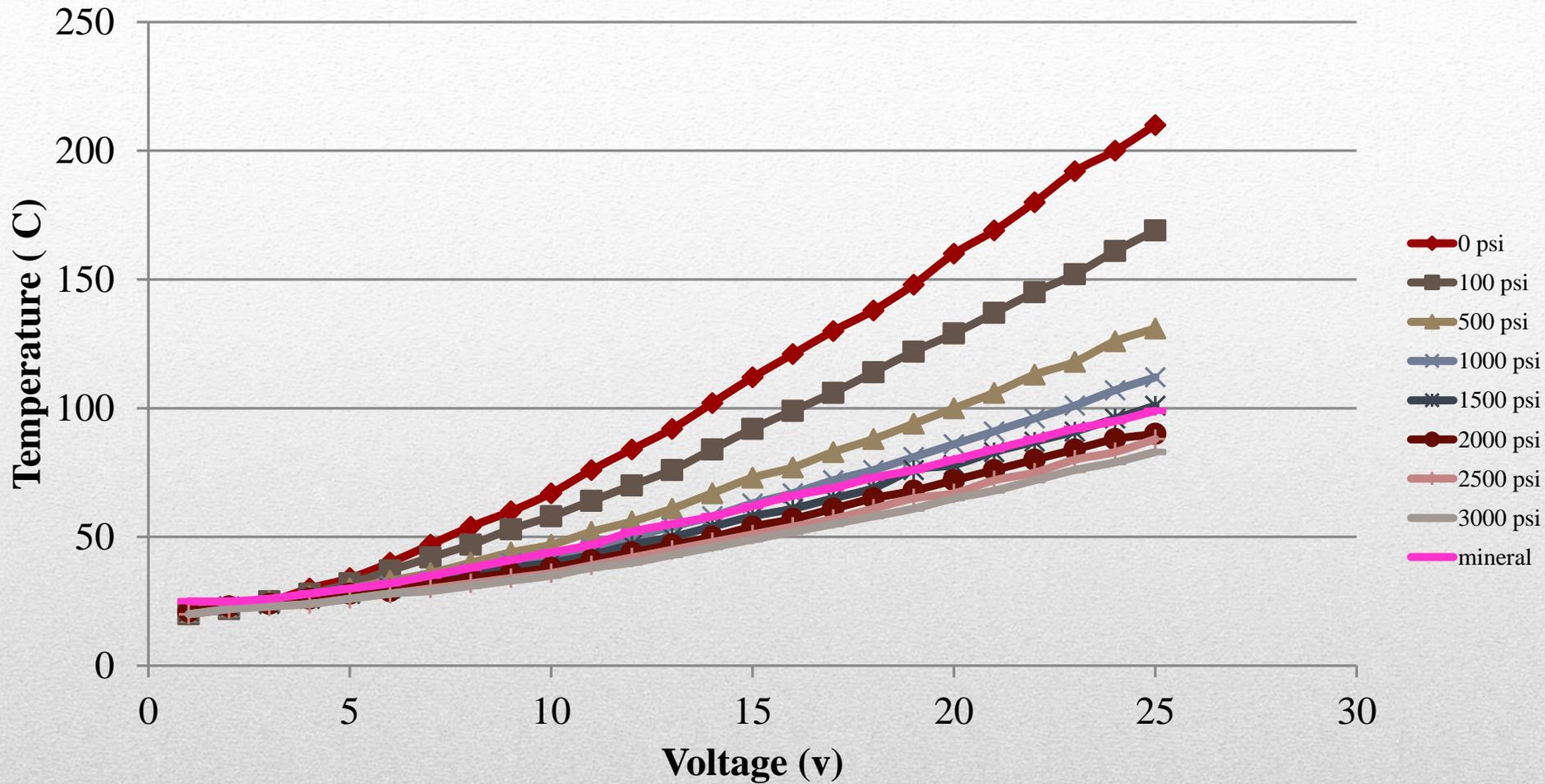
# Liquid Level Monitors



# High Pressure Experiment Set up



# Mineral Oil



# Effect of High Pressure

# CONCLUSION

The PT-1000 behaves as if it is in a liquid at high pressures, so PT-1000s fail as liquid level monitors.

- Henning Back
- Sam Norris
- Chris, George and Ian
- Quarknet Interns

# Acknowledgements

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