Study on the Abnormal Heat of Pd-D_2 System

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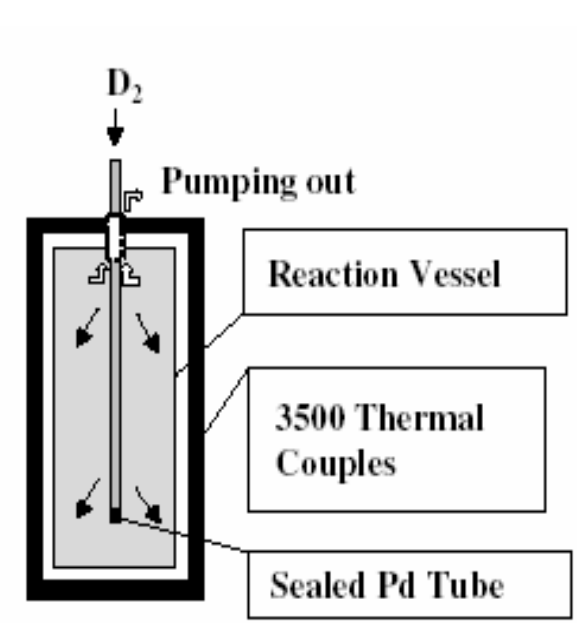
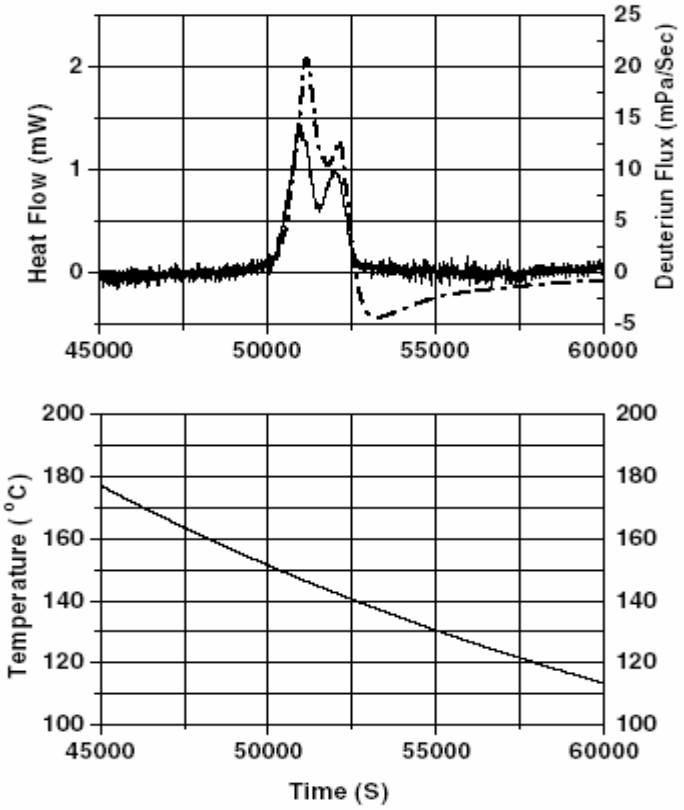
Guidance teacher：Zheng ShuXin

Source of our idea





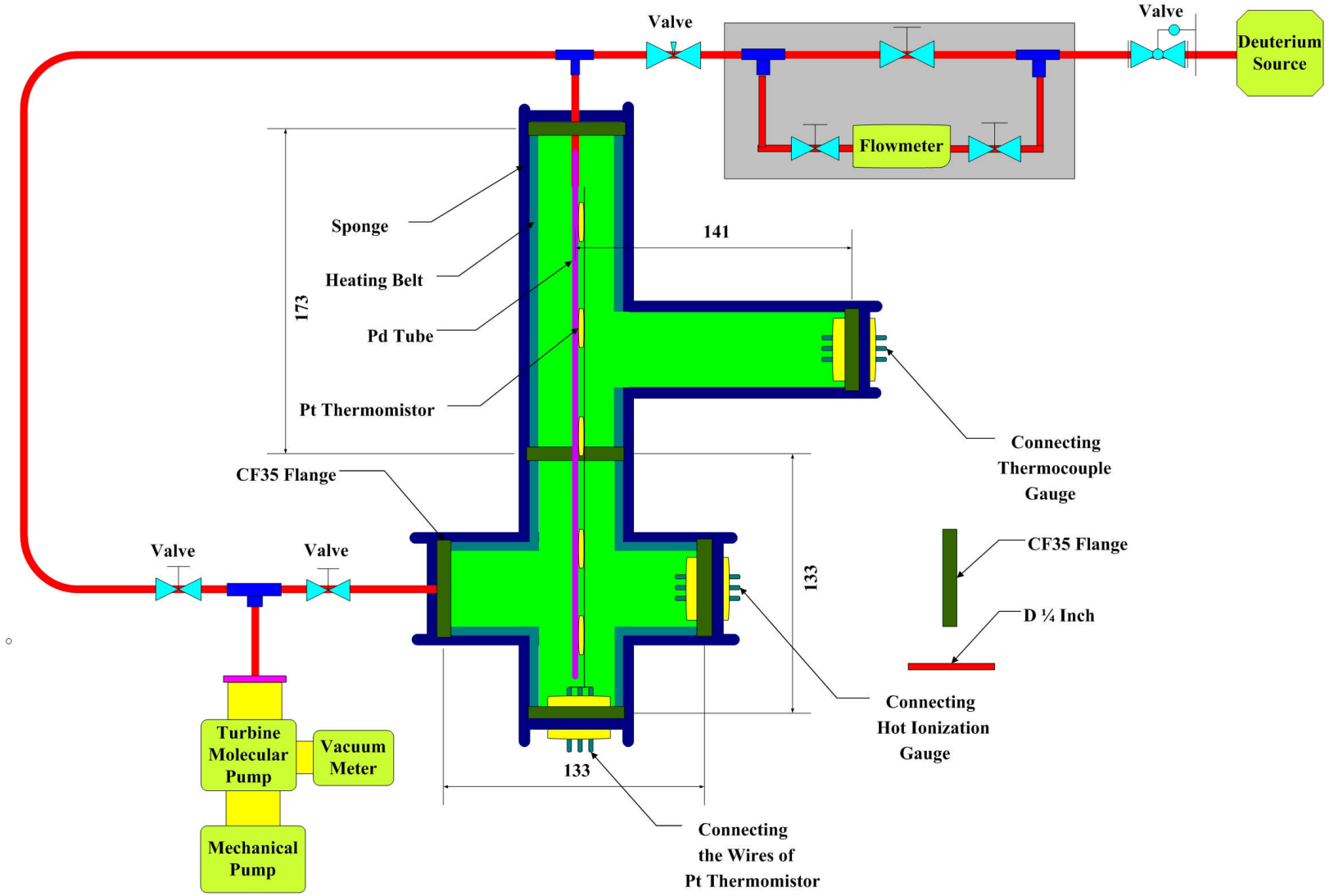
X.Z.Li, et al.,*J.Phys.D:Appl.Phys*.,36,3095 (2003).

Aims and methods of our experiment

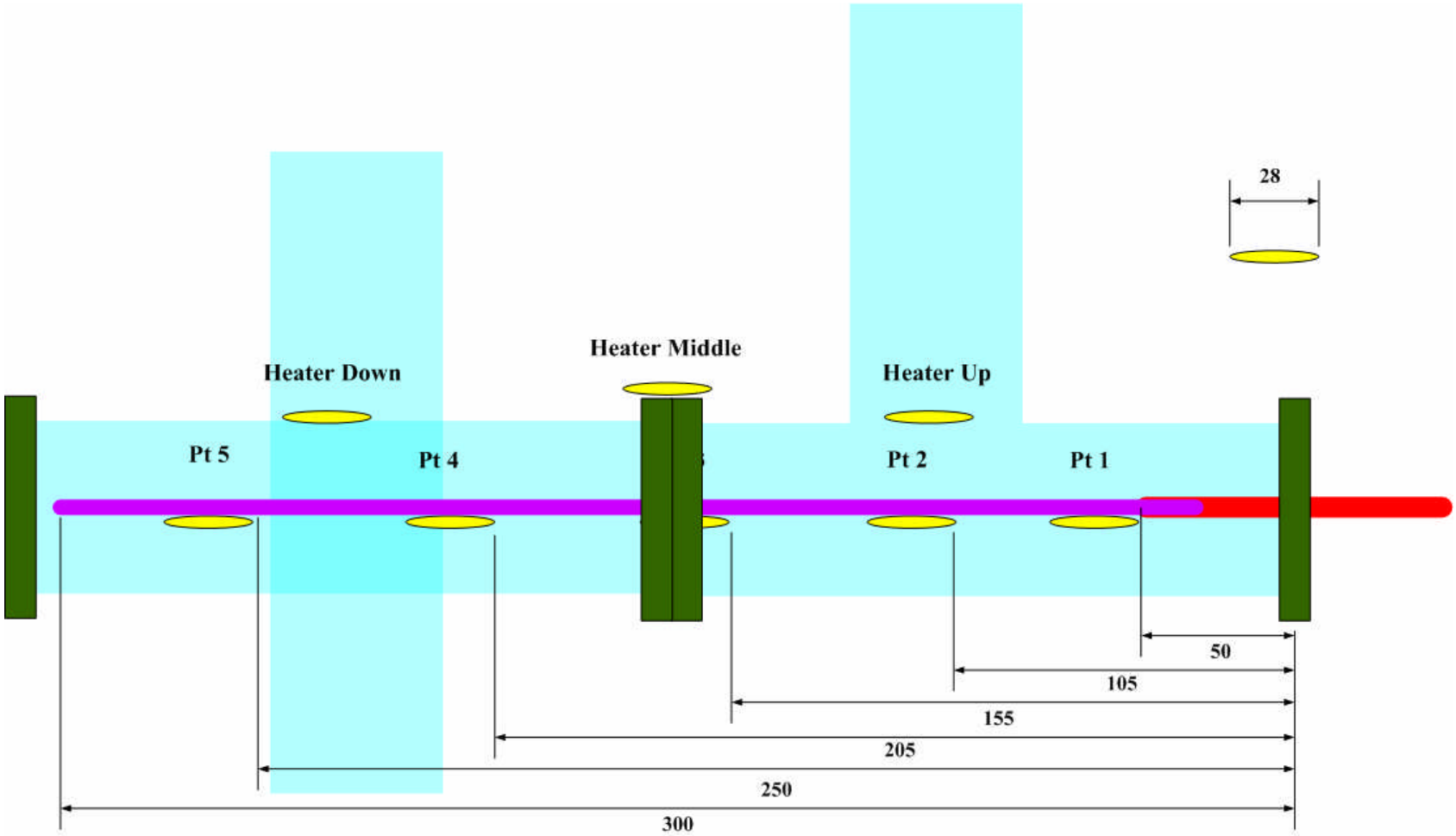
- Observe the abnormal heat
- Correlation with deuterium flux
- Find factors affecting the heat such as pressure, temperature

- Measure temperature instead of the heat flow

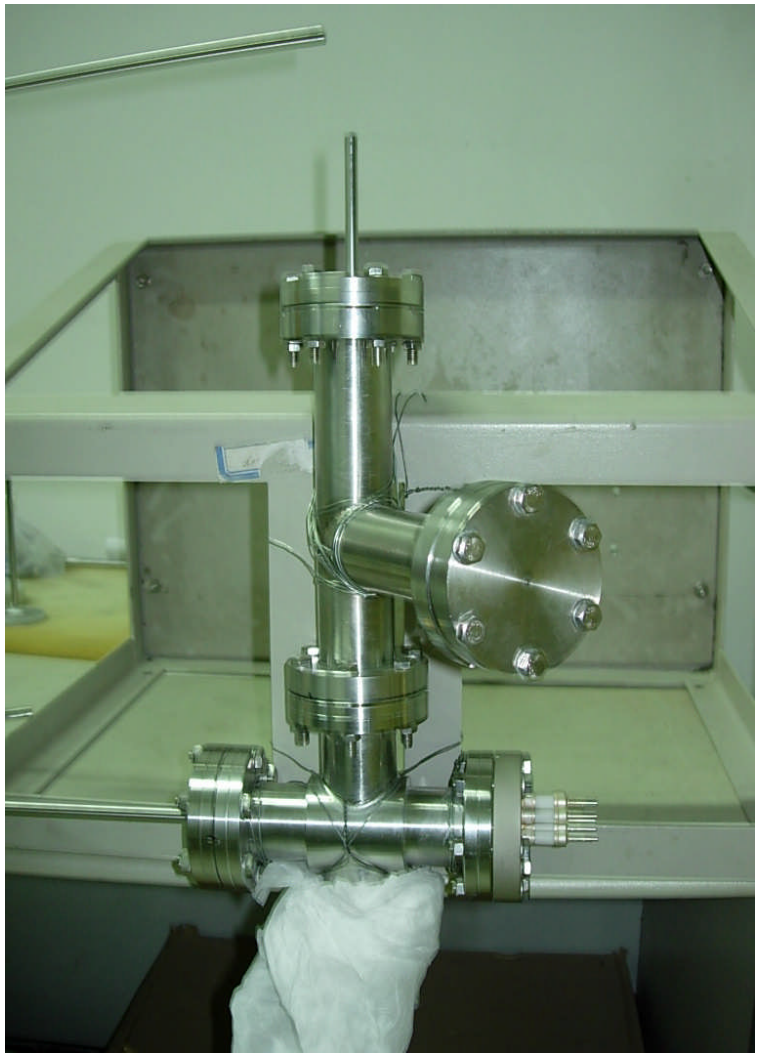
Schematic view of our apparatus



Schematic view of our apparatus



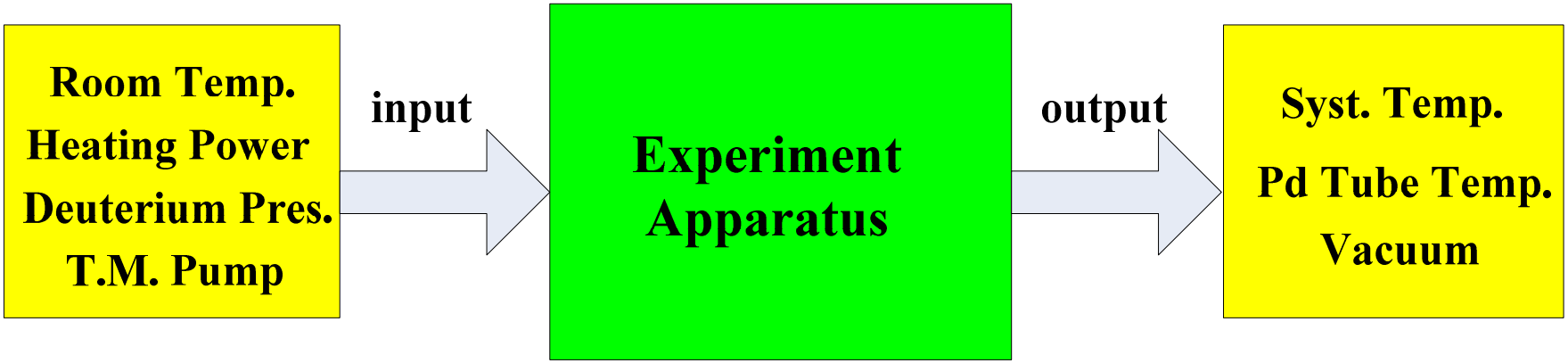
Picture of our apparatus



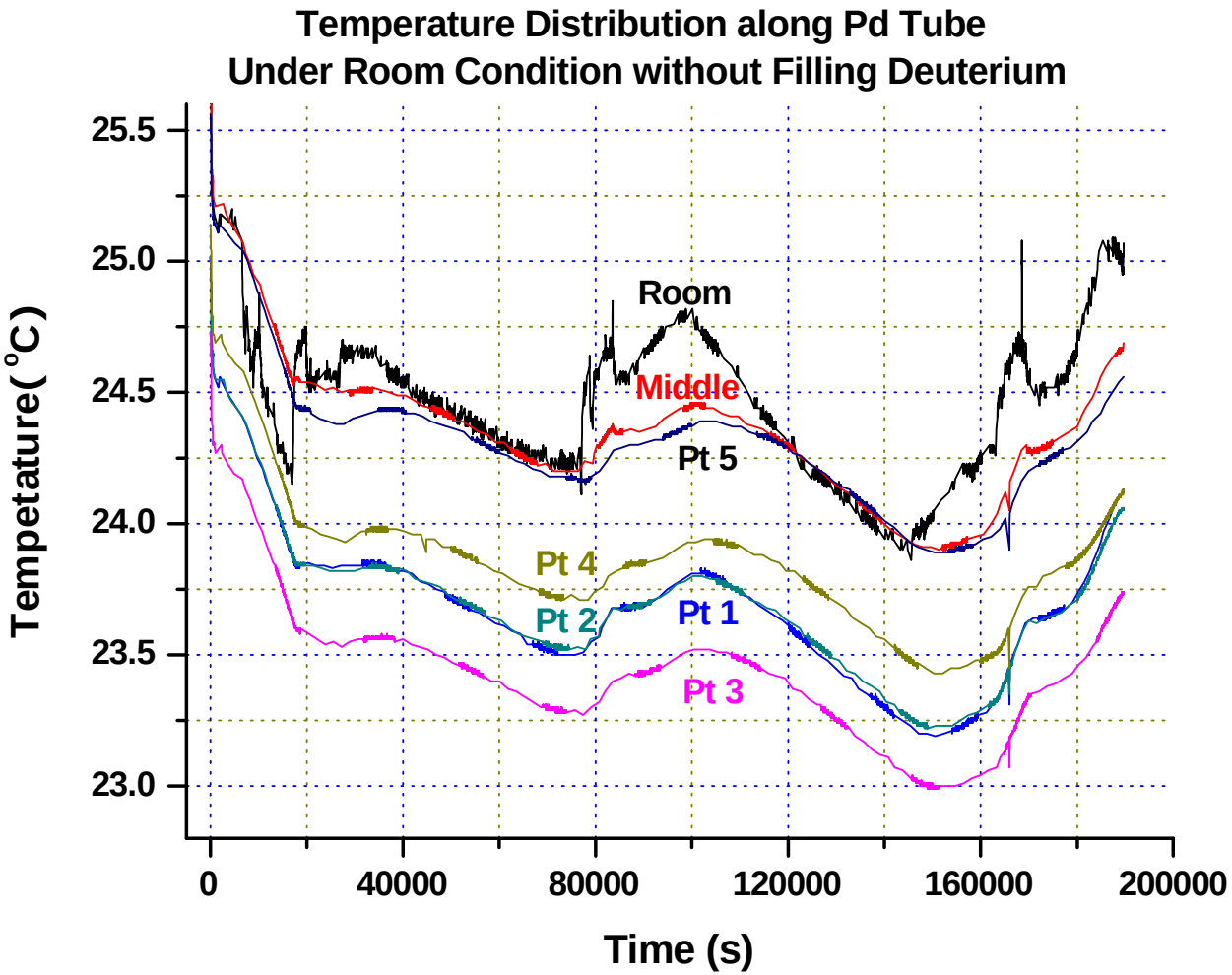
Picture of our apparatus

Picture of our apparatus

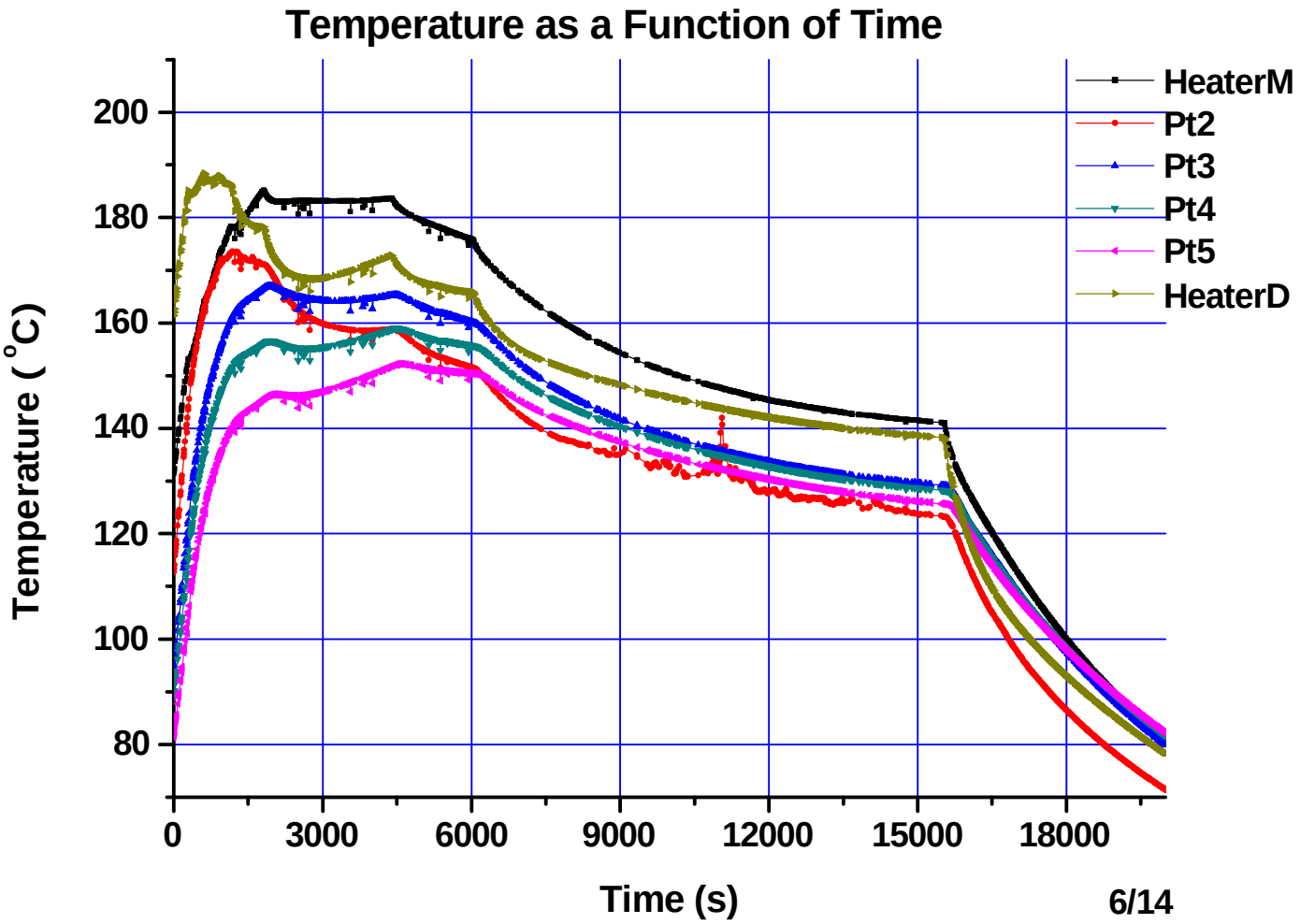
Black box model of our apparatus



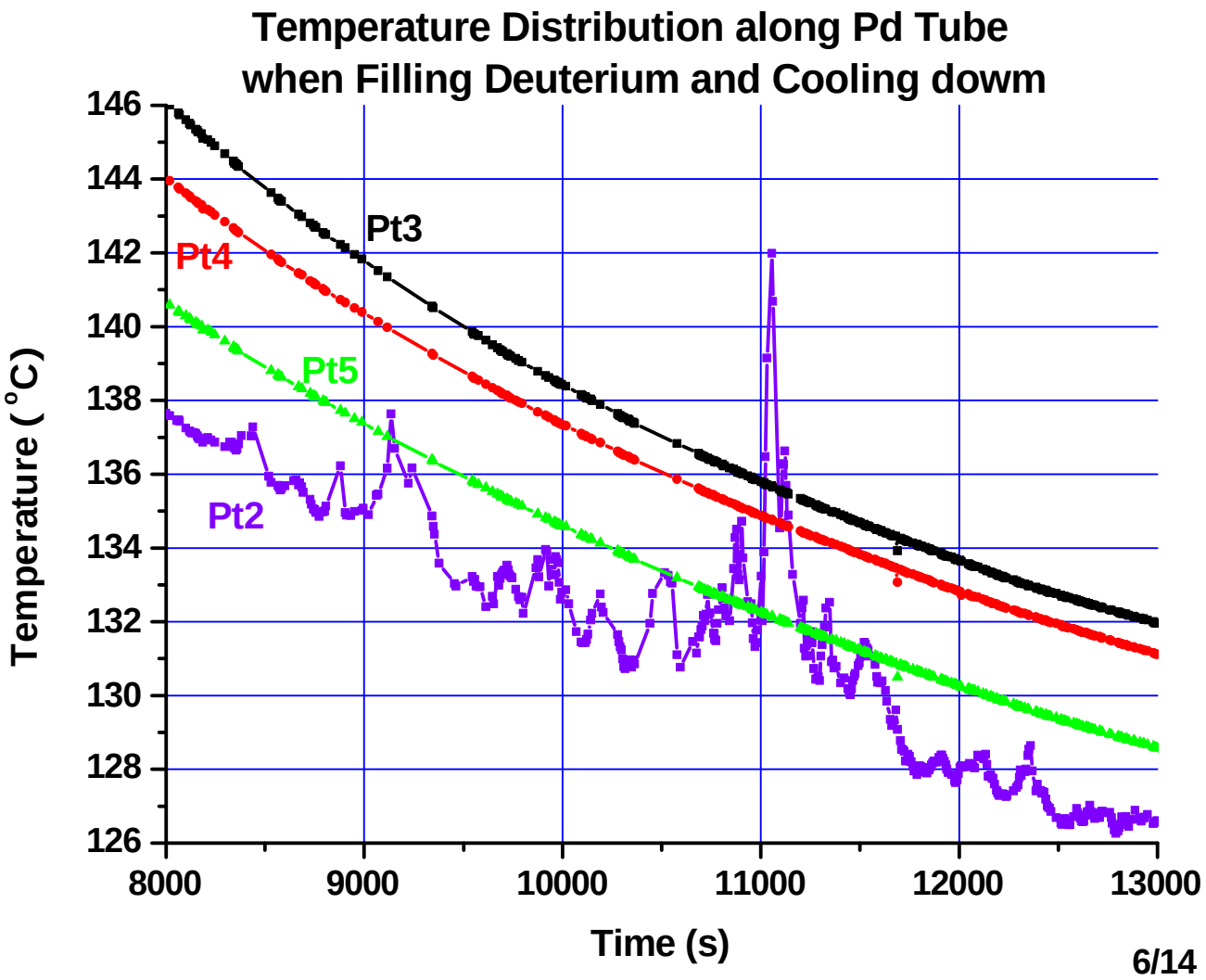
Results of our experiment (5/26)



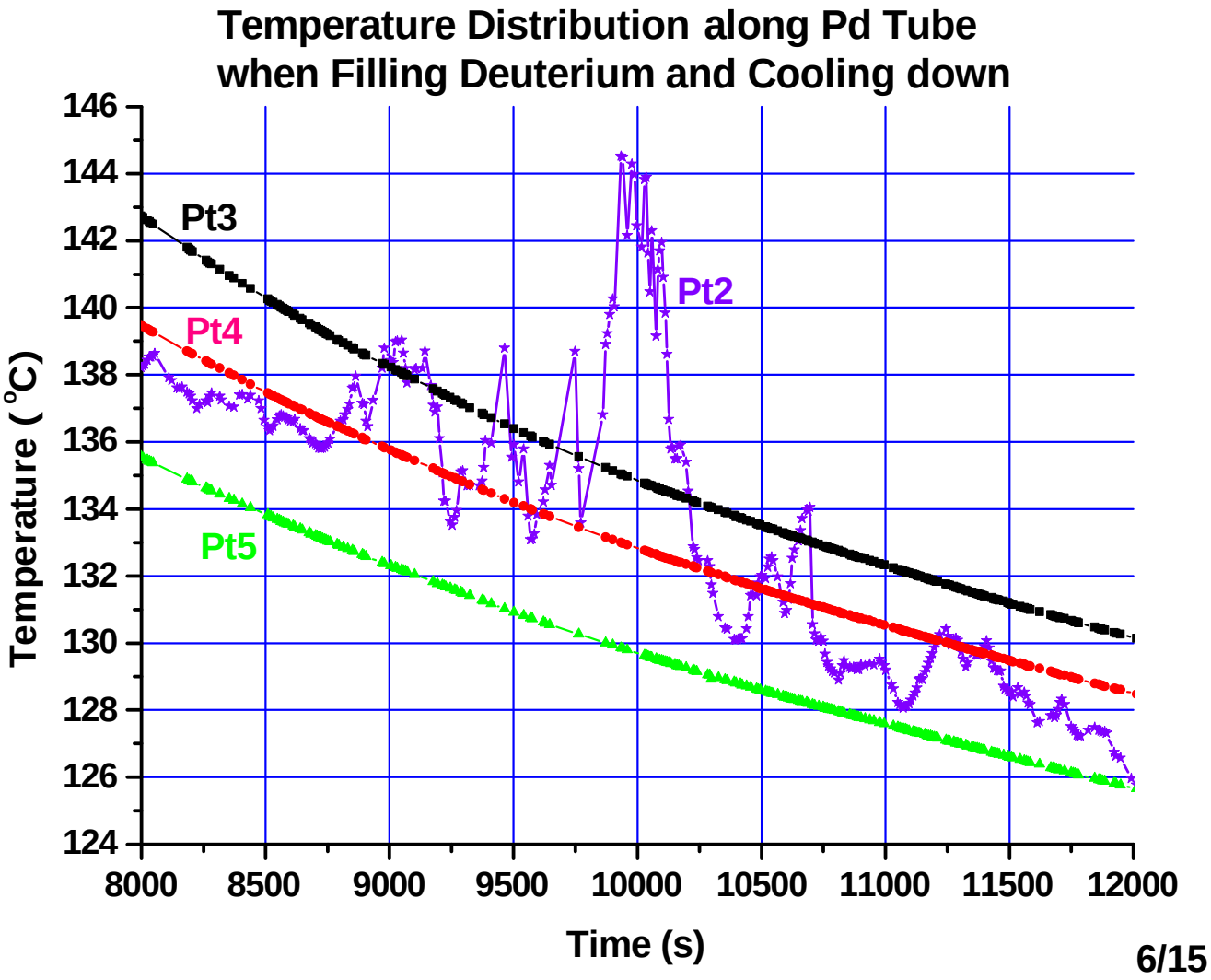
Results of our experiment (6/14)



Results of our experiment (6/14)



Results of our experiment (6/15)



Discussion of the experiment

Summary of the Conditions
when the Abnormal Variation Happened

Position	Pt2 Thermistor （105~130mm）
Temperature Range	128°C~138°C
Max Value of the Variation	~10°C
Lasting Time	~3000s
Pressure inside the Pd Tube	~0.14MPa
Pressure outside the Pd Tube	~2Pa
Heating Power	~25W

Discussion of the experiment

- Did the Pt2 thermistor work correctly?
  Did the temperature of the Pd tube near Pt2 change?
  Why did only Pt2 change?

Possible affecting factors:

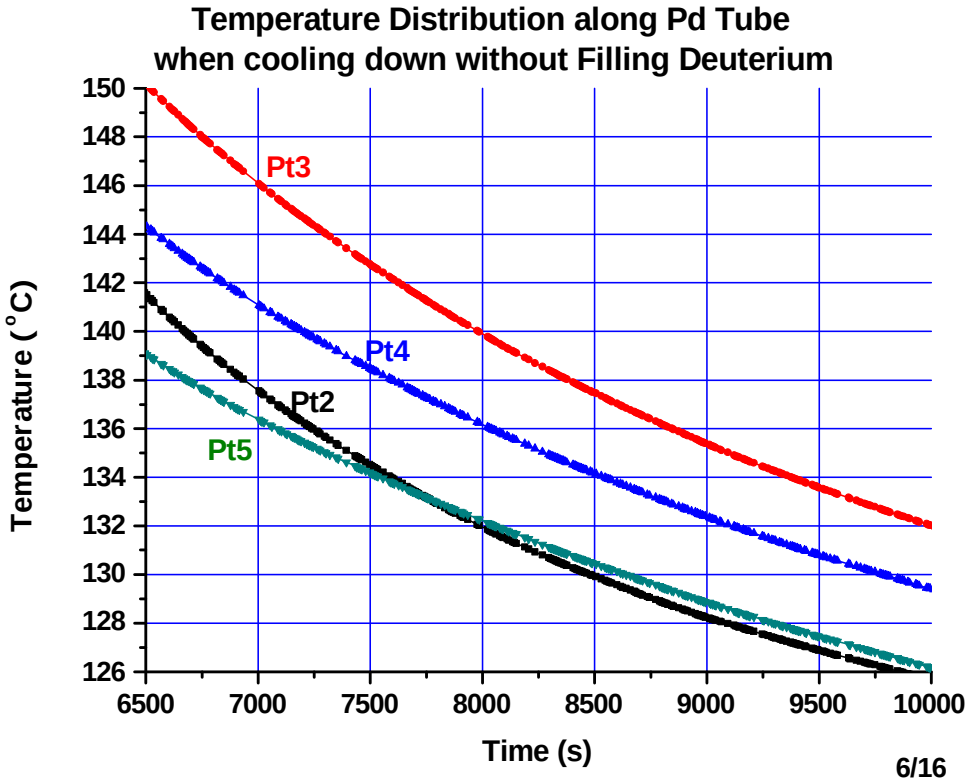
Keithley Model 2000 DMM

Resistance of the whole circuit

of course, temperature change

Discussion of the experiment

- Is the change of temperature caused by filling deuterium?



Experiment conducted on 6/16
No variation observed

Discussion of the experiment

- How does the deuterium lead to the raising of the temperature?

Possible mechanisms:

Heat Exchange

Detaching and Attaching of Deuterium

Joule-Thomson Effect

Of course, Maybe Nuclear Reactions!

Conclusion of our experiment

- Abnormal Variation of Resistance
- Correlation with Abnormal Deuterium Flux not Detected
- Reproducible (once)

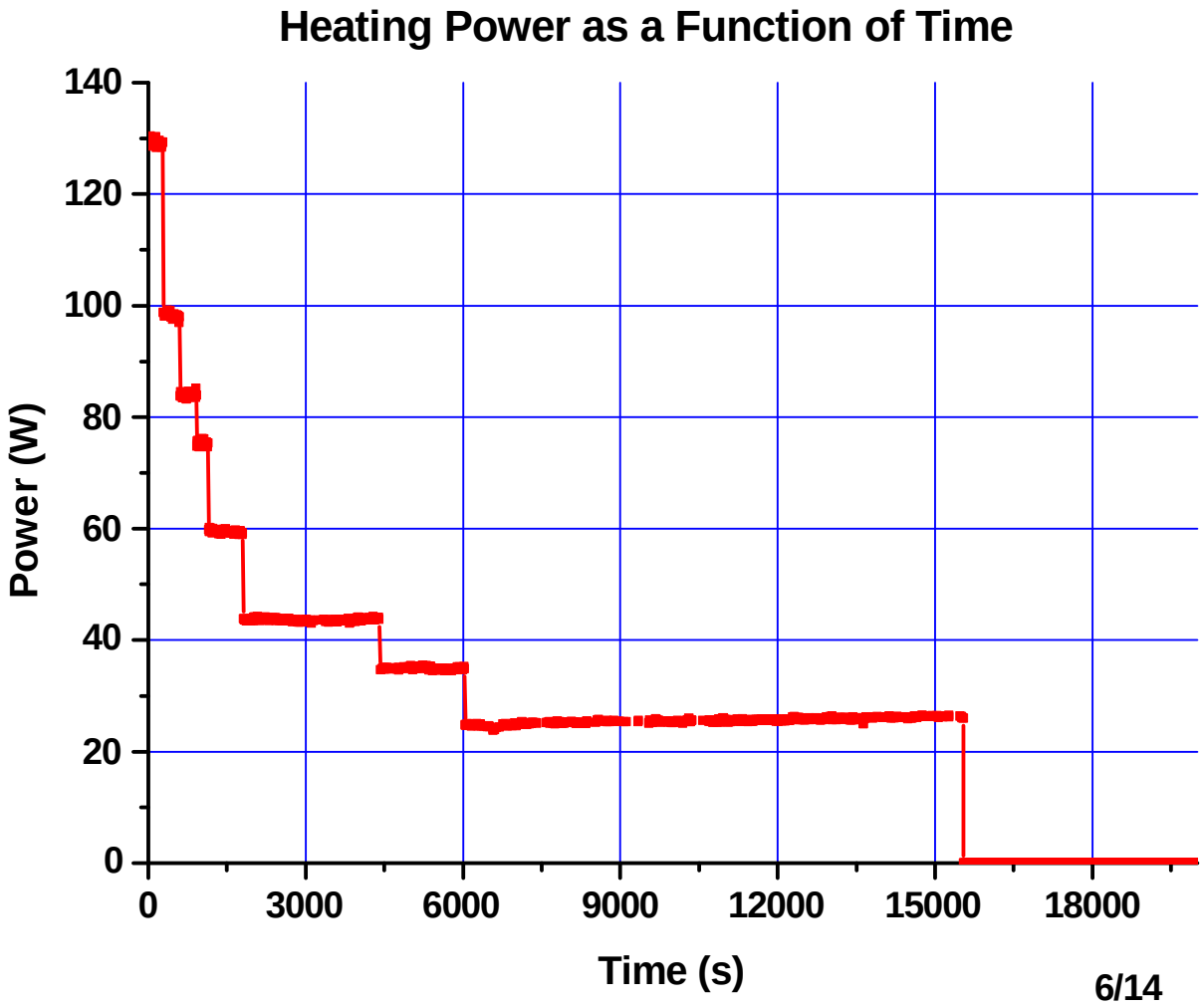
- Further study is expected to identify the reasons!

Suggestions to further study

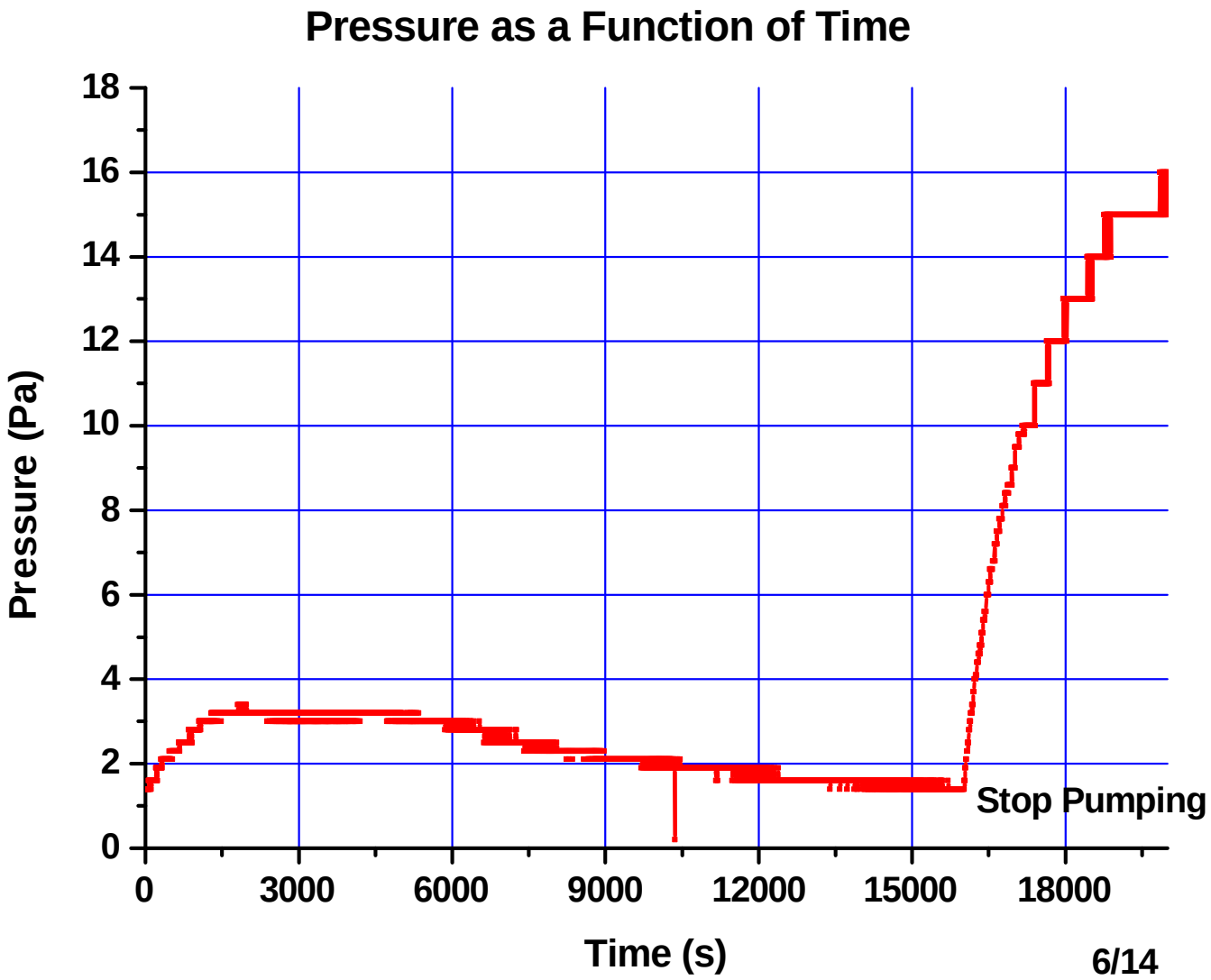
- Try to prolong the time of the abnormal variation by increasing the heating power
- Filling hydrogen to the Pd Tube to eliminate some possible reasons
- Measure the DC volt to identify whether the abnormal variation is caused by the change of resistance

Thanks

Supplement-Power(6/14)



Supplement-Pressure(6/14)



Supplement-Room Temp. (6/14)