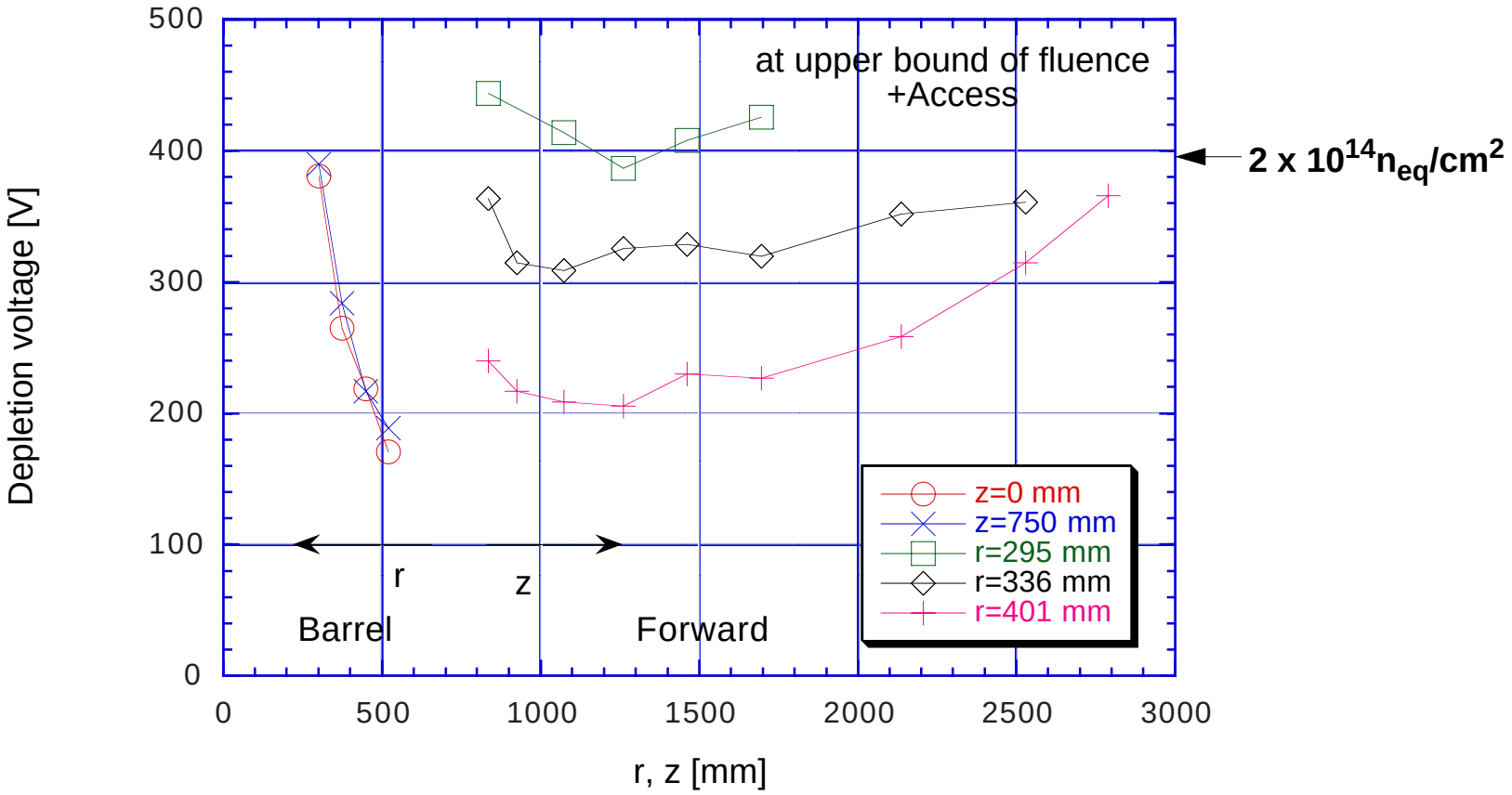
# Full depletion voltages in SCT



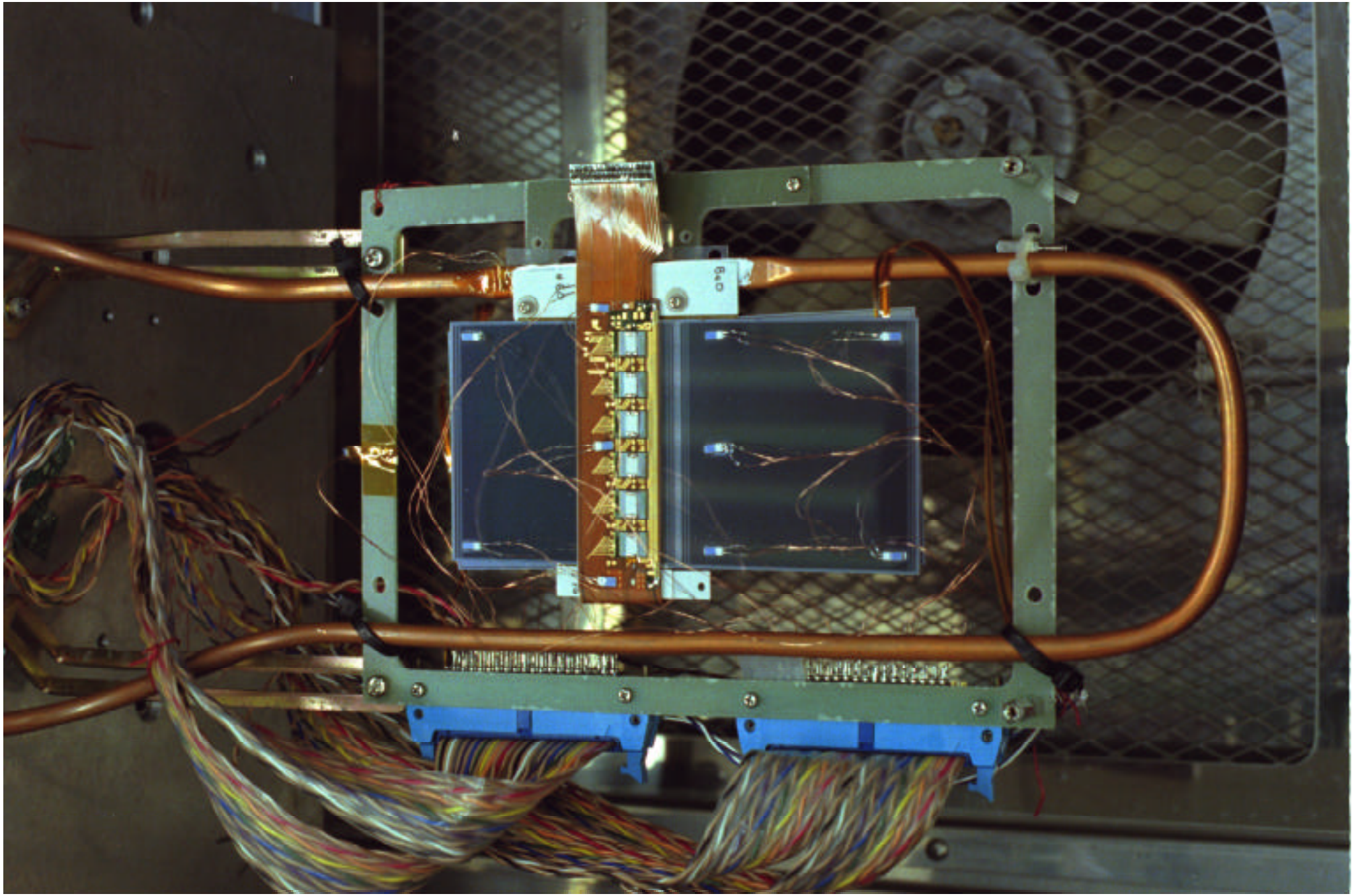

Expected depletion voltages for barrel and forward modules, at the upper bound of expected fluence and an access scenario of 2 days at 20 °C and 14 days at 17 °C every year (ref: Inner detetor TDR)

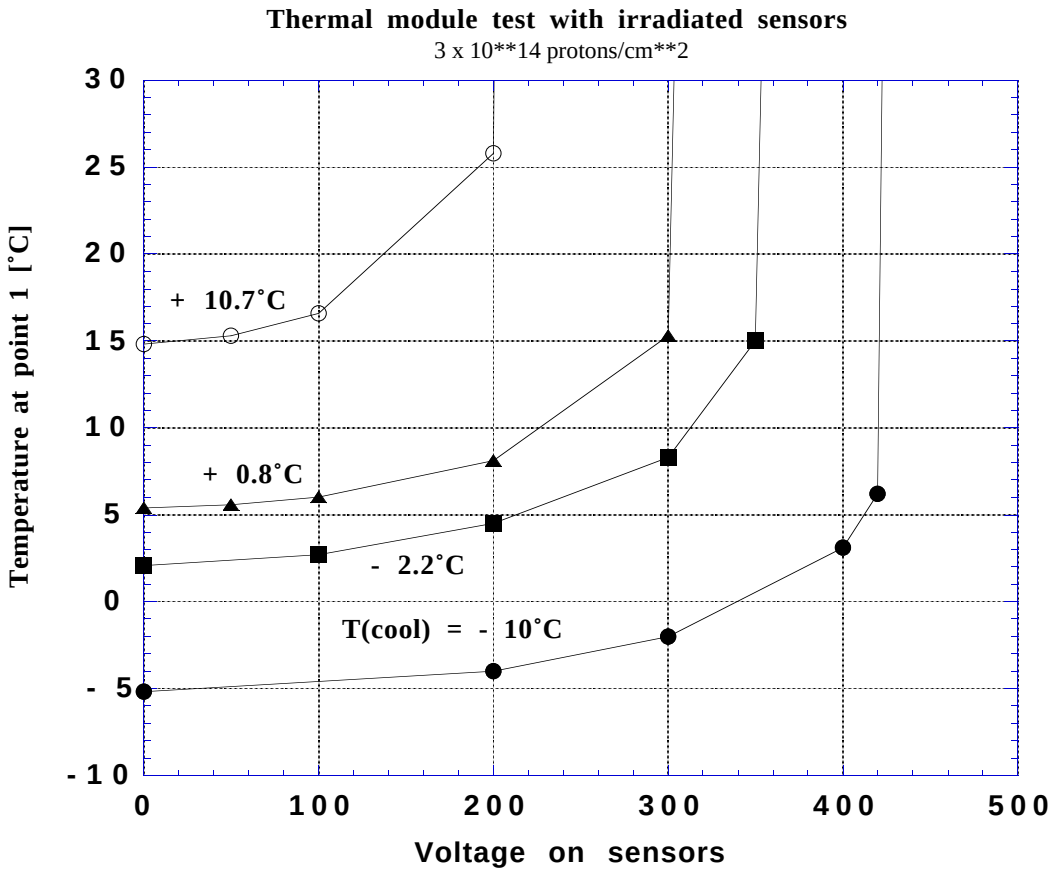
# Thermal runaway measurement

- **Barrel module**
- **With proton- irradiated detectors at $3x10^{14}$ $p/cm^2$**
- **Kapton hybrid with Be bridges**
- **The coolant temperature was at -10 °C due to the capability of cooling unit**
- **At the SCT operation of -15 °C and the runaway point will be extended near to the 500 volts**



Y. Unno 4/7/98



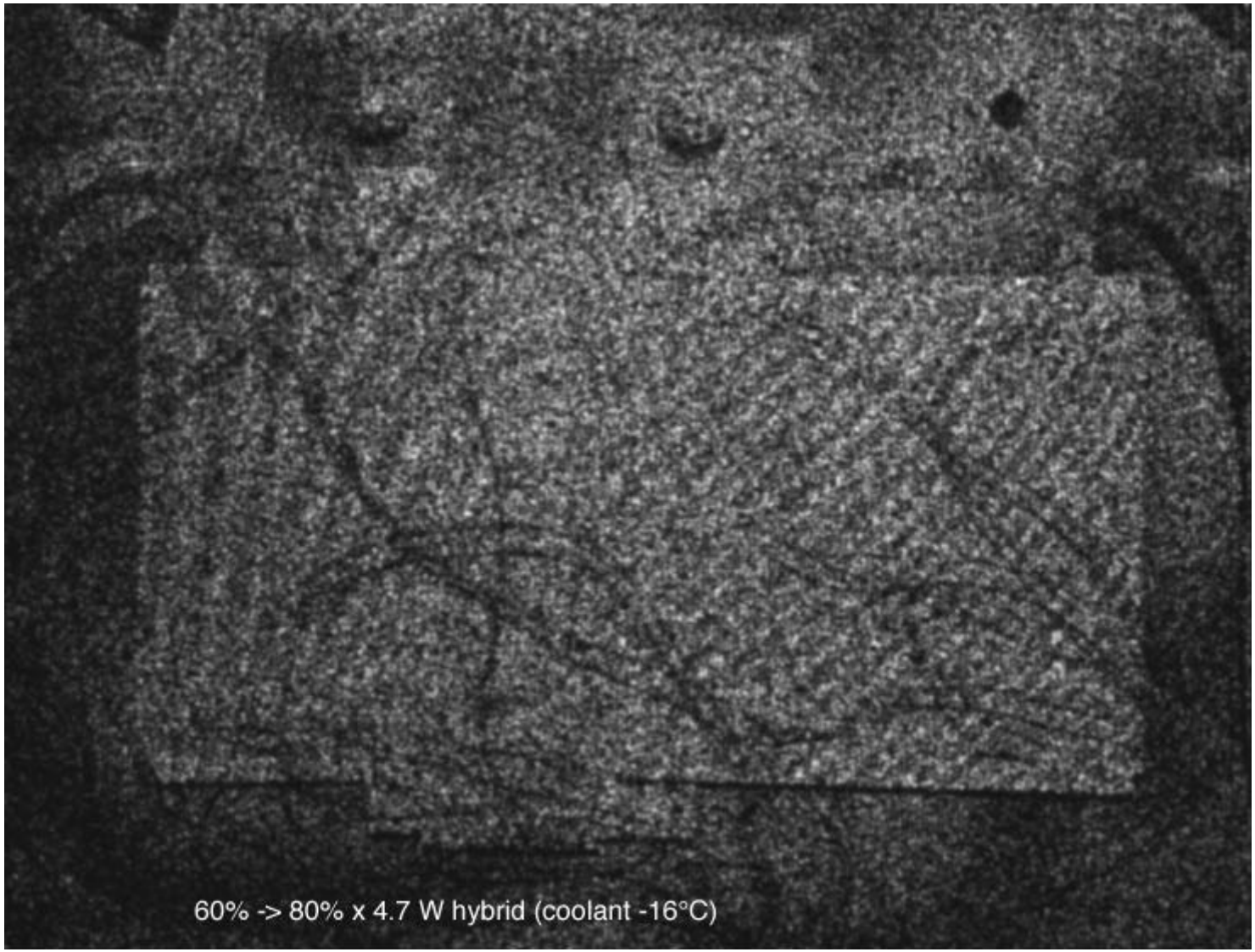

Thermal module test with irradiated sensors
3 x 10**14 protons/cm**2
Temperature at point 1 [˚C]
30
25
20
15
10
5
0
- 5
- 10
0
100
200
300
400
500
Voltage on sensors
+ 10.7˚C
+ 0.8˚C
- 2.2˚C
T(cool) = - 10˚C

# Thermo-distortion measurement

- **Thermal runaway module with irradiated detectors, and Kapton hybrid with Be bridges**

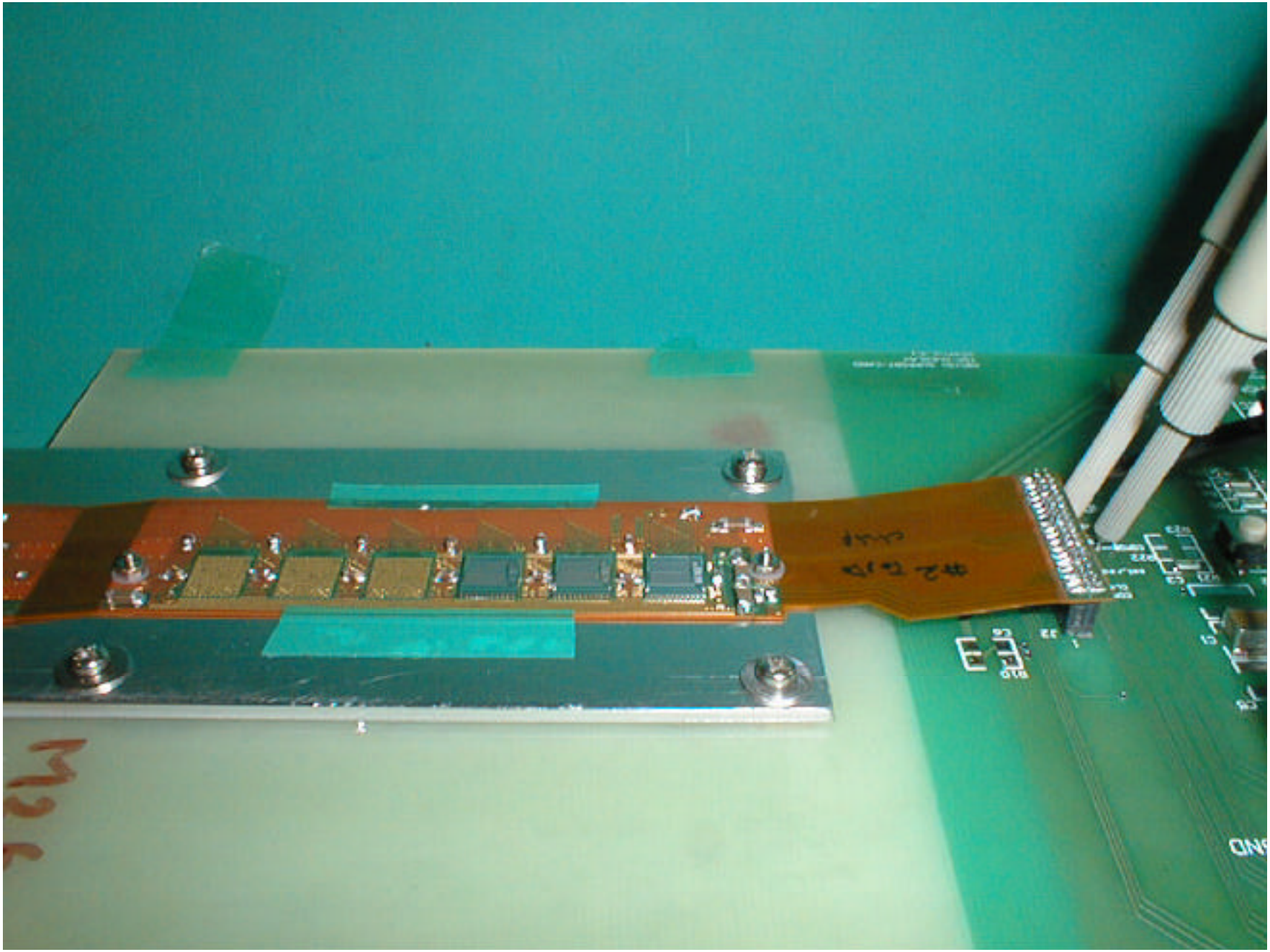
- **Although the module distortion was elastic, there was a rather large distortion, 36 fringes, i.e., 9 microns, over 20% change of the power in the hybrid**

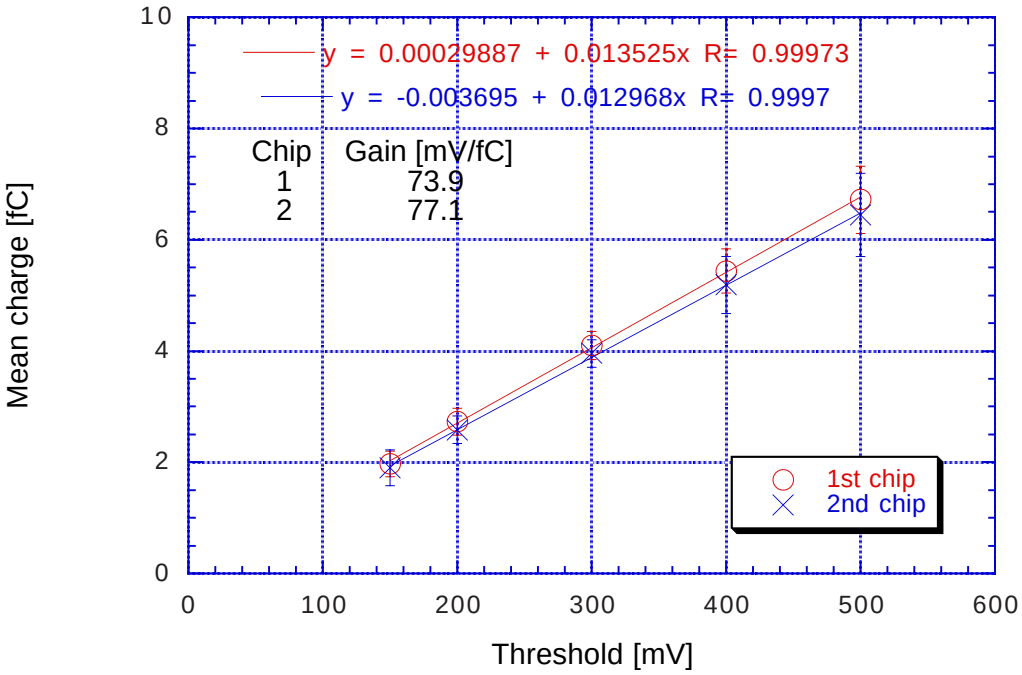
- **The above distortion was plausibly caused by the (rotation-)offset of the top and the bottom hybrids**

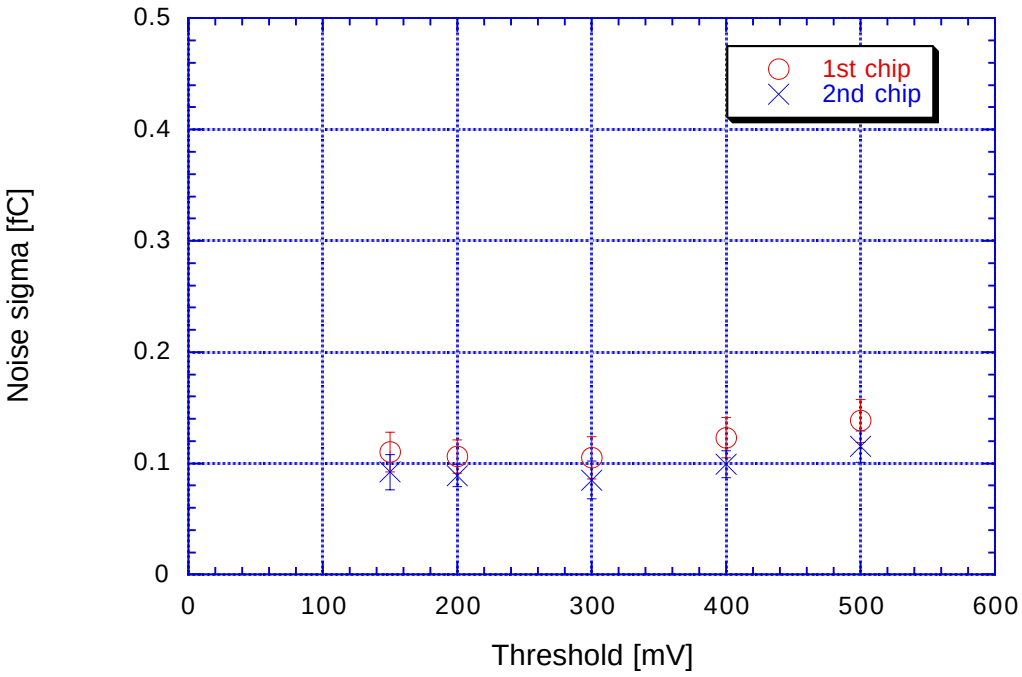

60% -> 80% x 4.7 W hybrid (coolant -16°C)

# Kapton hybrid development

- **Low-mass solution by replacing BeO ceramics with Be (or Carbon material)**
- **First full-size prototype was fabricated**
- **Testing of the hybrid and the ABCD chips are being underway**




y = 0.00029887 + 0.013525x R= 0.99973
y = -0.003695 + 0.012968x R= 0.9997
Chip Gain [mV/fC]
1 73.9
2 77.1
1st chip
2nd chip
Mean charge [fC]
Threshold [mV]
0
2
4
6
8
10
0
100
200
300
400
500
600


1st chip
2nd chip
Noise sigma [fC]
Threshold [mV]
0
0.1
0.2
0.3
0.4
0.5
0
100
200
300
400
500
600