AGENDA for BEAST-KEKB Meeting

Start @ 10:30

Background results from diodes and drift tubes	Browder
Vacuum Pressure and Baking	Mohapatra
MOSFETs integrated doses	Moffitt
CsI Results	Schwartz
ZDLM	Uehara
EFC Results	Ueno
Simulation	Bozek
Plans and Future Experiments	All

99- 2-19;13:16 ;BELLE GROUP ;+81-298-64-5340 # 2/ 22

BEAST Status

(Tom Browder, University of Hawaii)

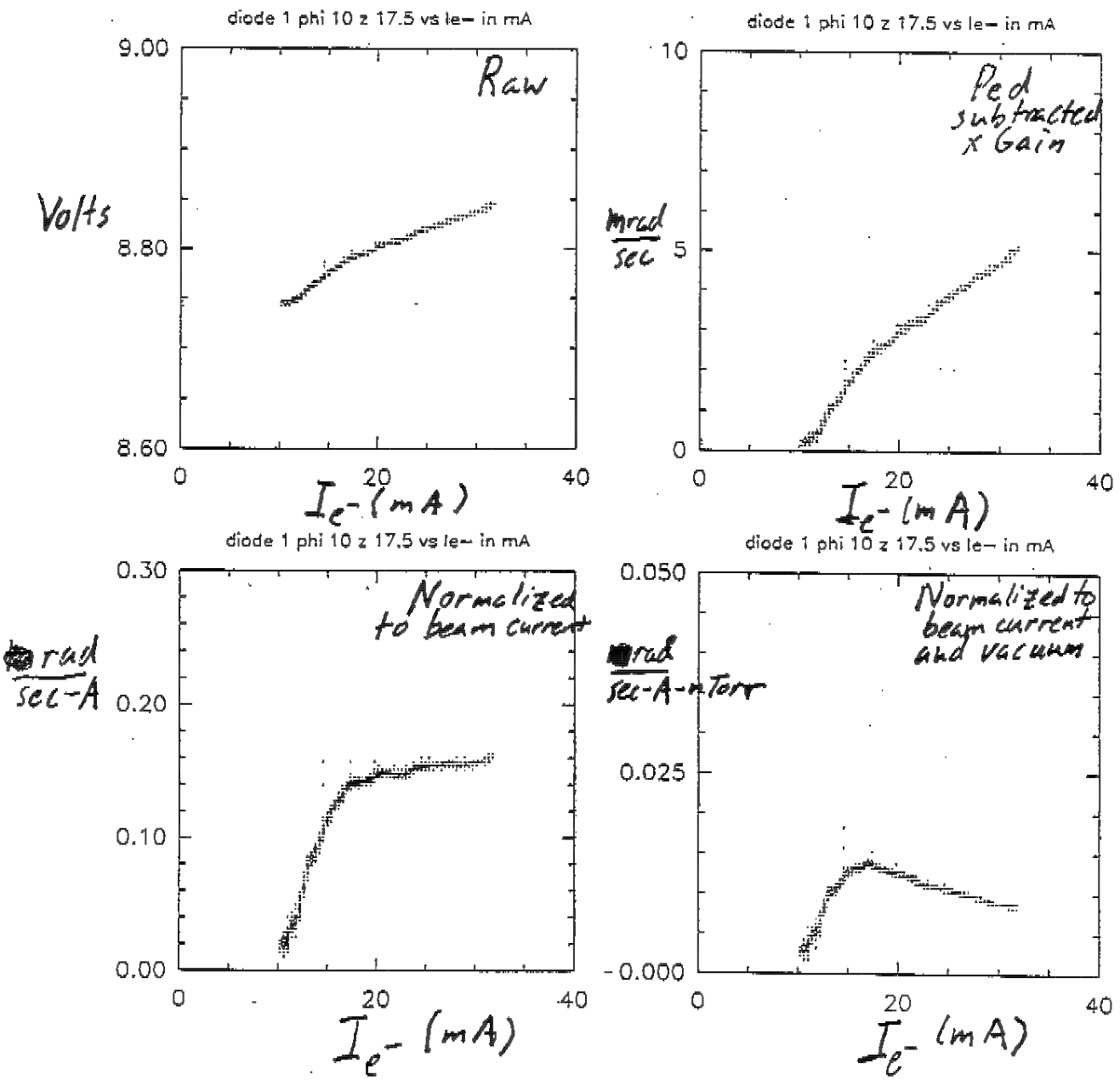
Conditions during Steady State Running

Conditions during Injection

Effect of Orbit Drift Problem on Backgrounds

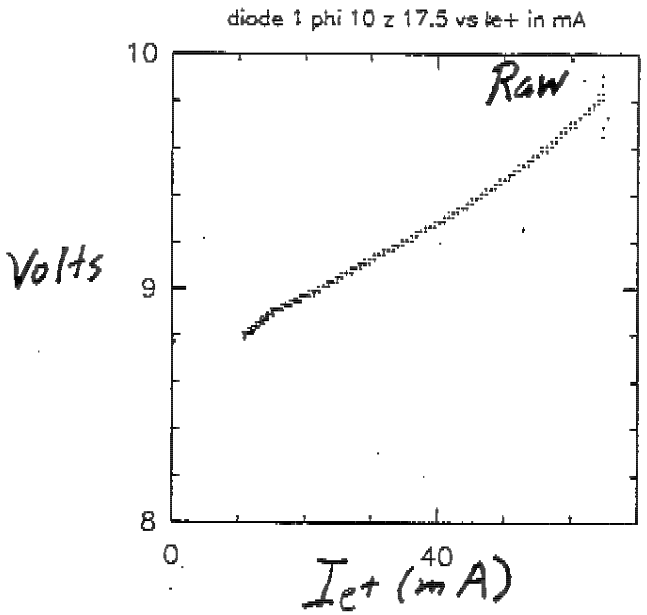
Conclusion

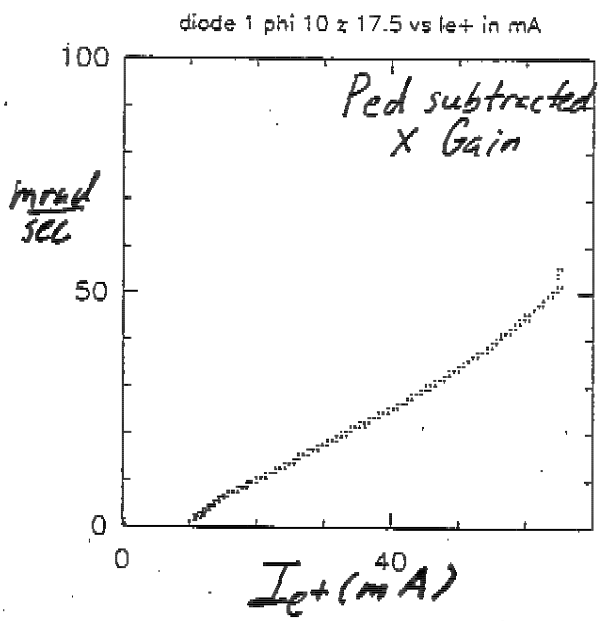
HER run, diode #1

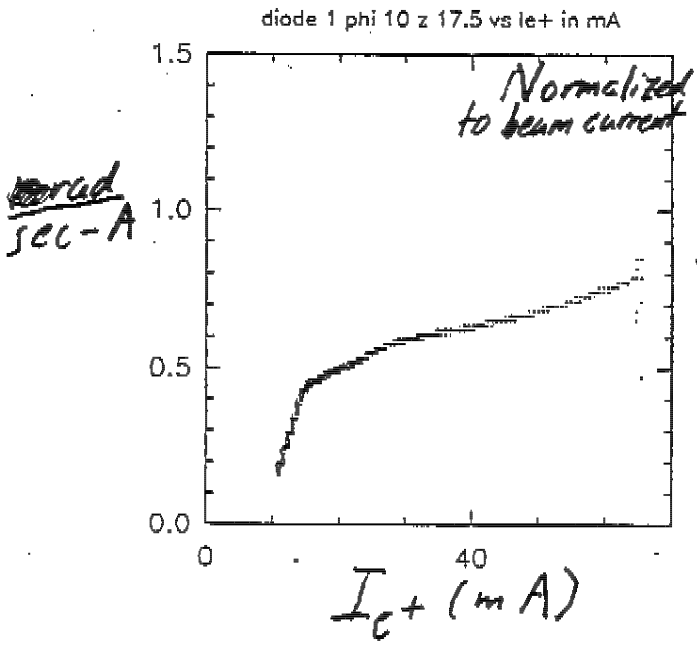


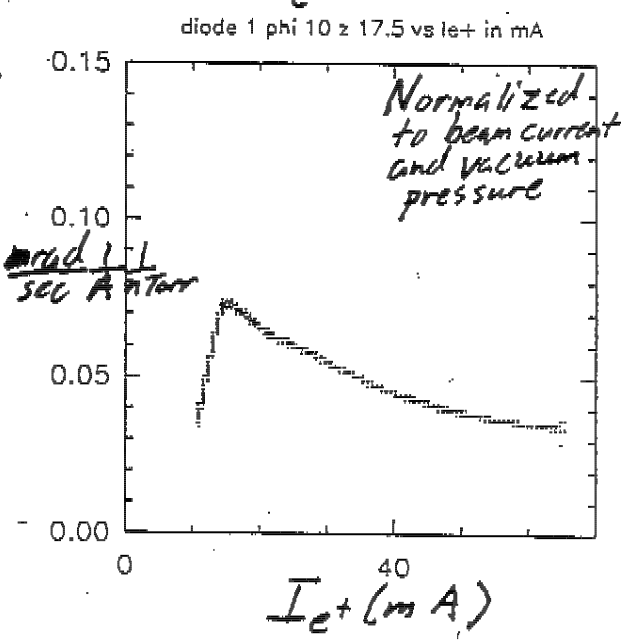
Detector Problem: Time dependent annealing of radiation damage ⇒ time dependent shift of pedestal.

LER run, diode #1



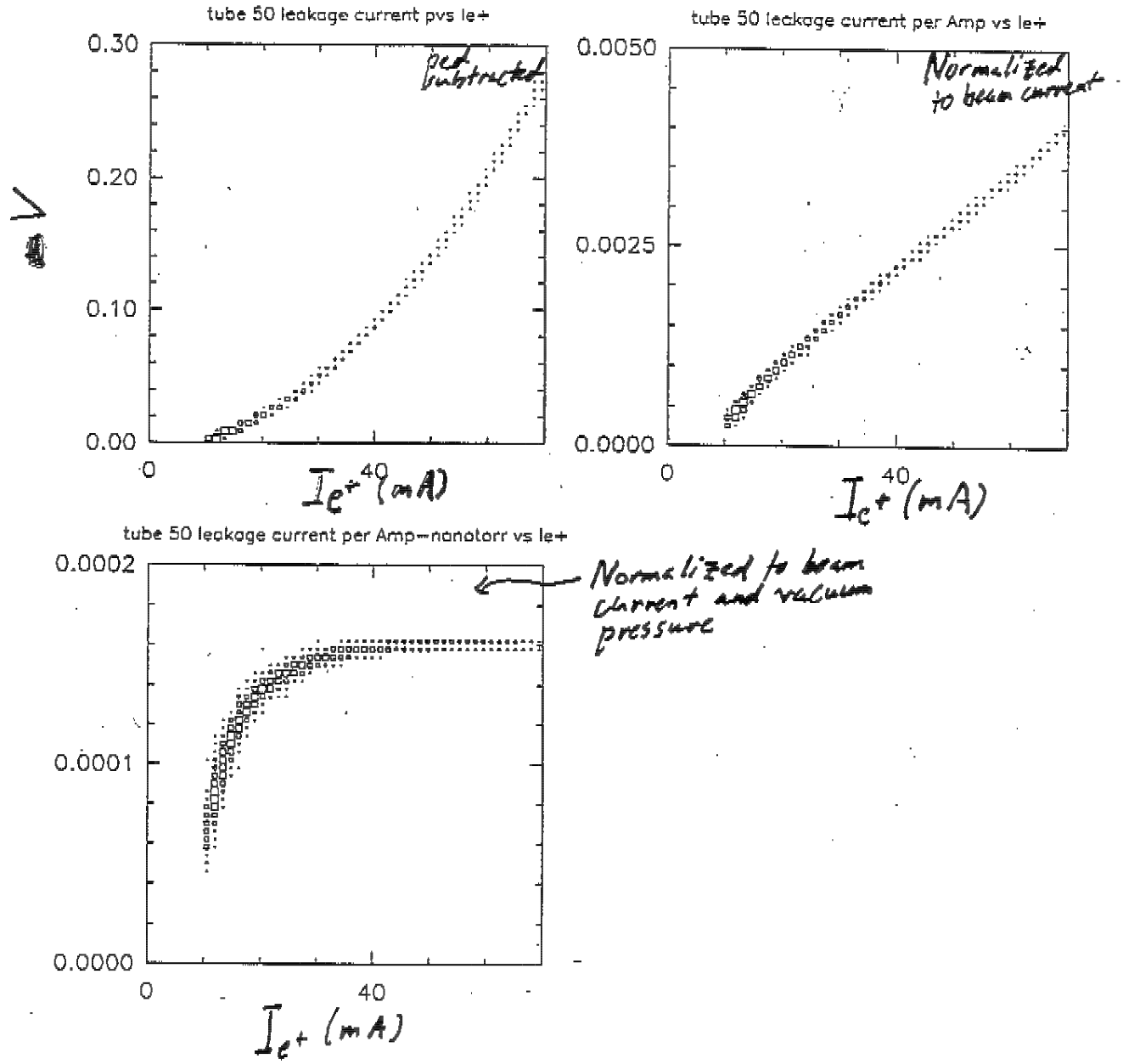






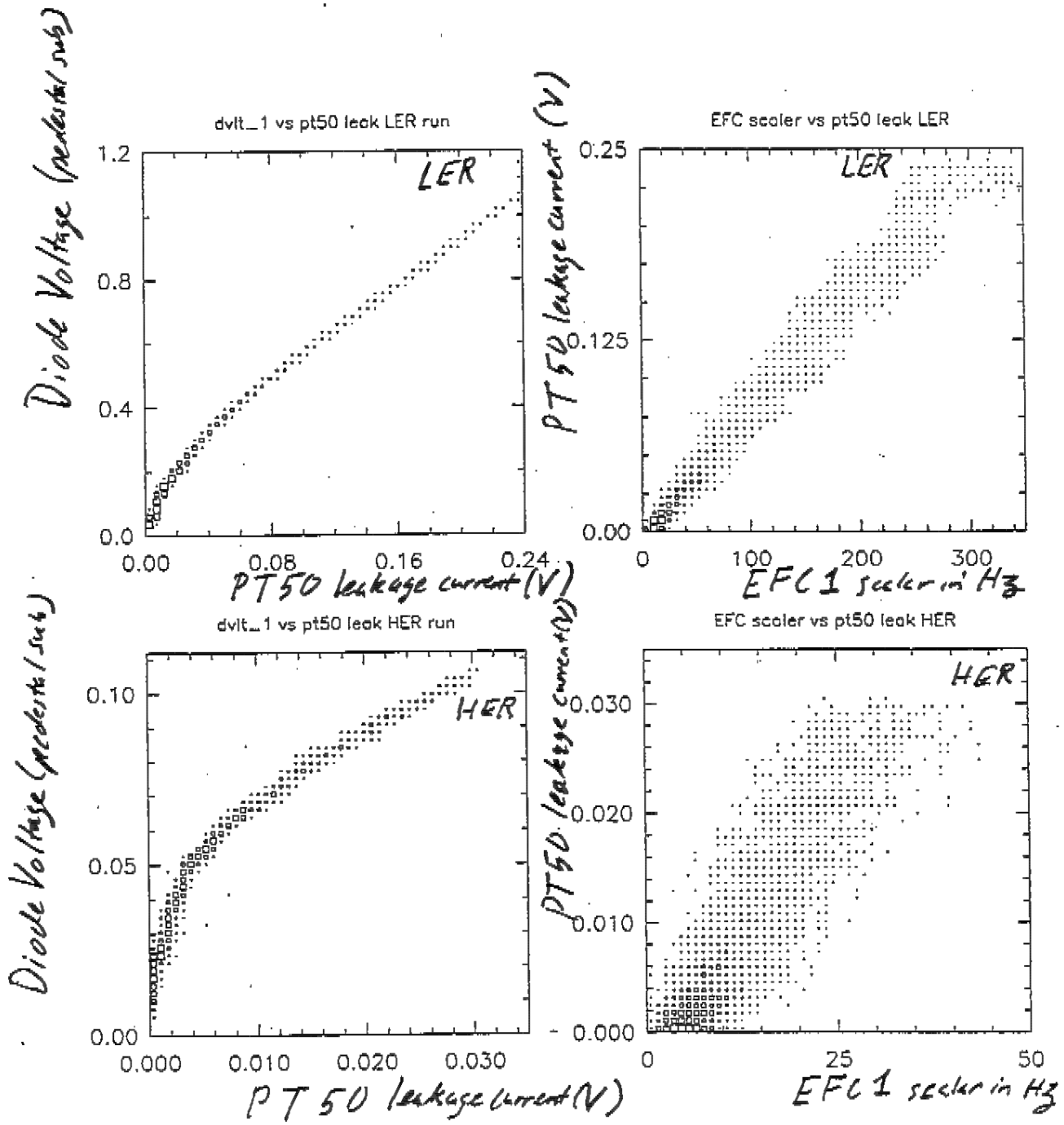
LER run, with tube 50 leakage current

Gain of amplifier is 22mV/μA



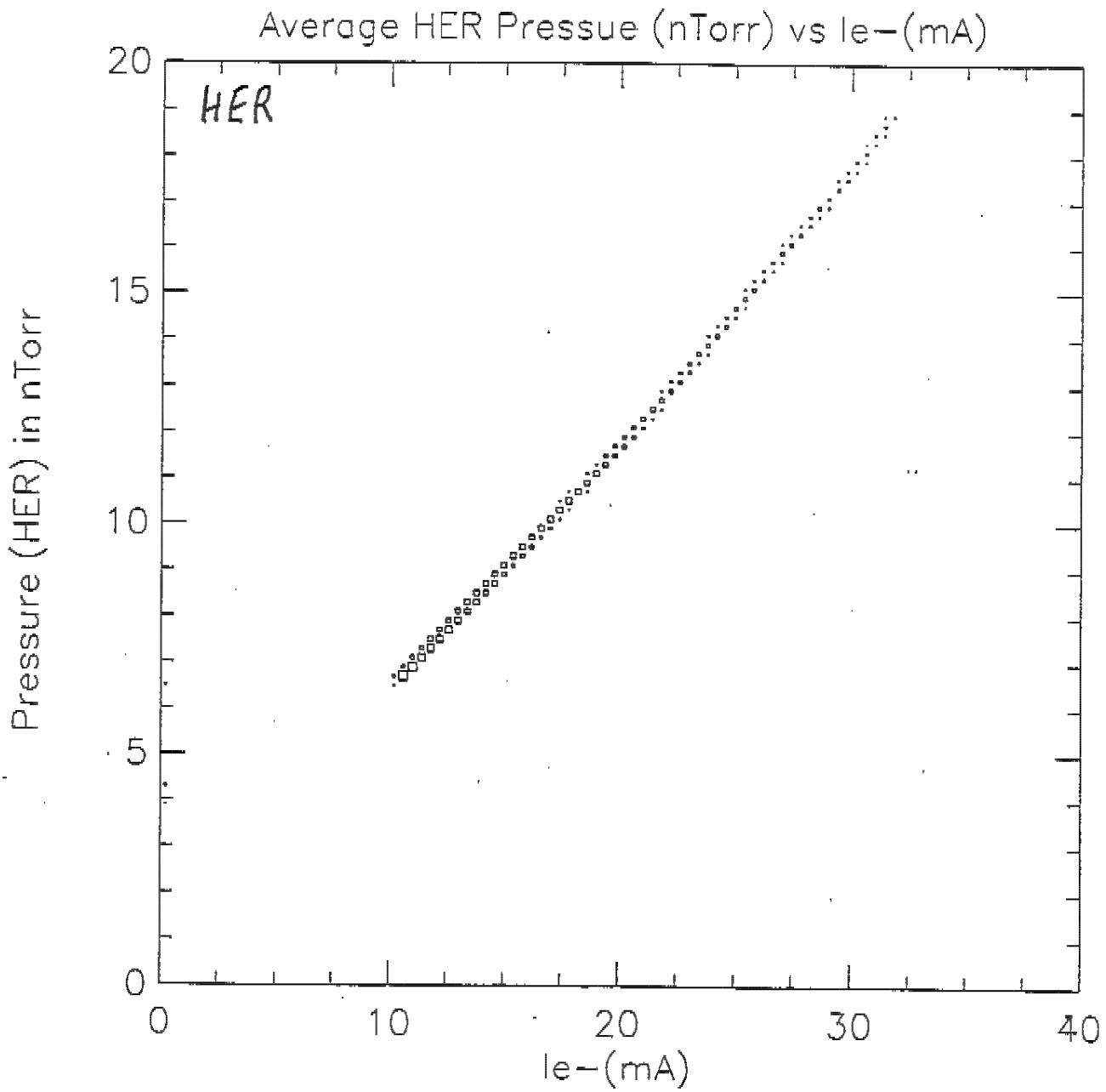
Detector detail: Tubes run at low gain, $V = 1.5 \times 10^3$ V nominal 1.9×10^3 V. Trips at higher voltage.

Correlations between different detector components.



$$P = P_{0_{HER}} + \beta_{HER} I$$

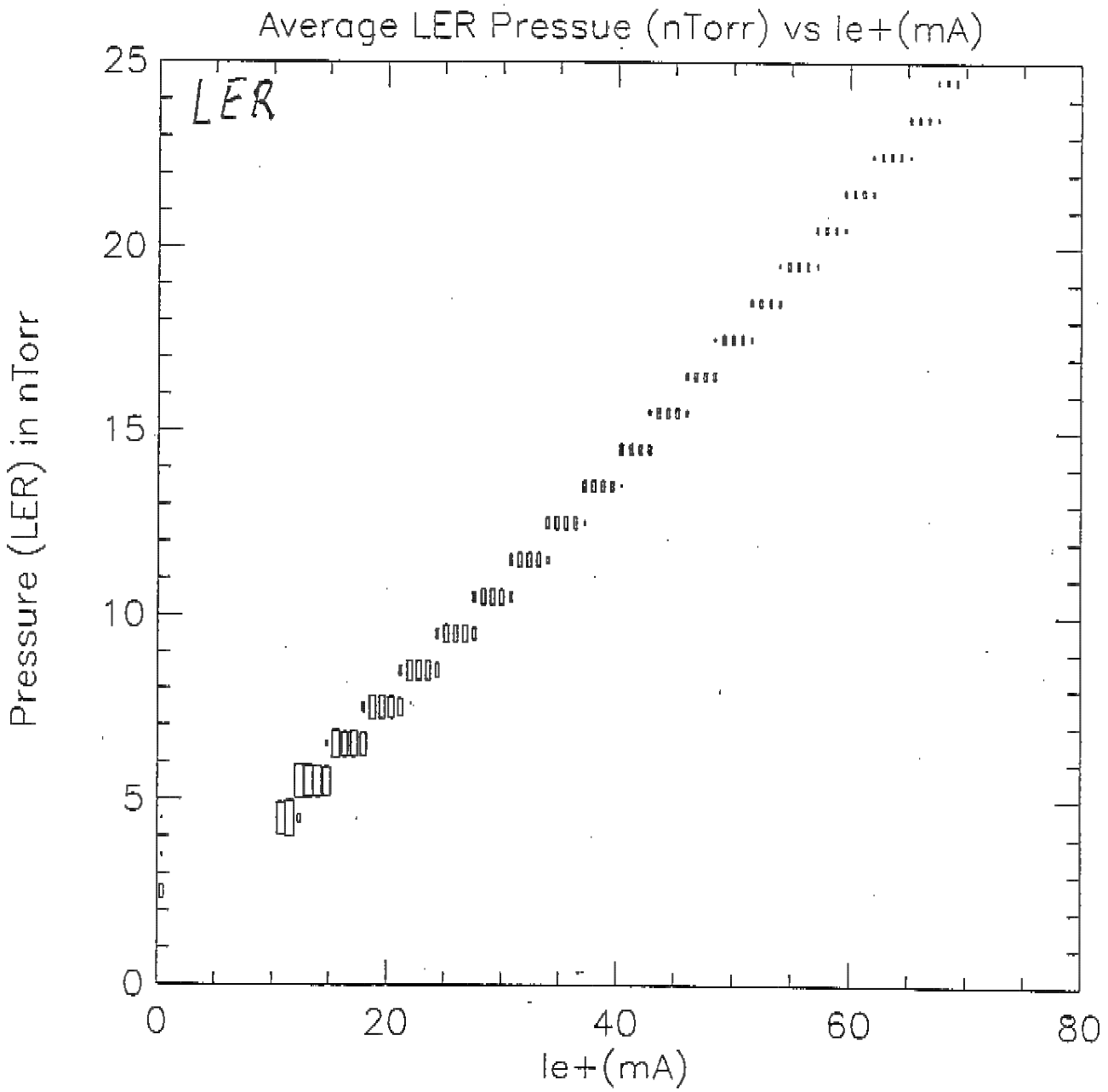
base dynamic



Expect Particle Backgrounds Scale as $P \cdot I$

$$P = P_{0_{LER}} + \beta_{LER} I$$

base dynamic

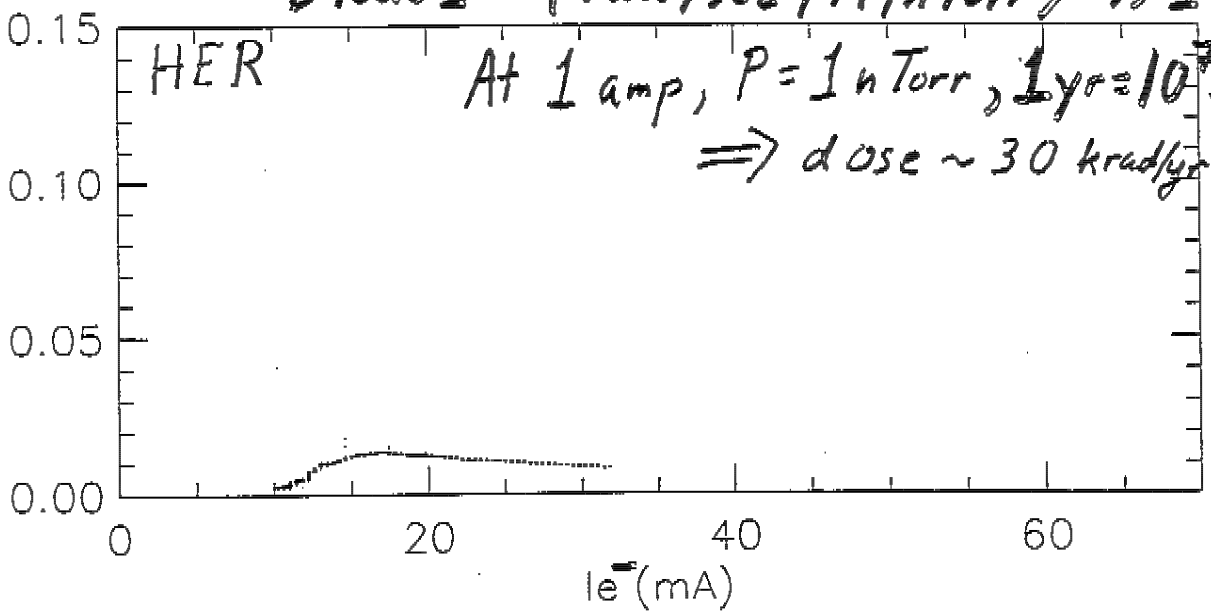


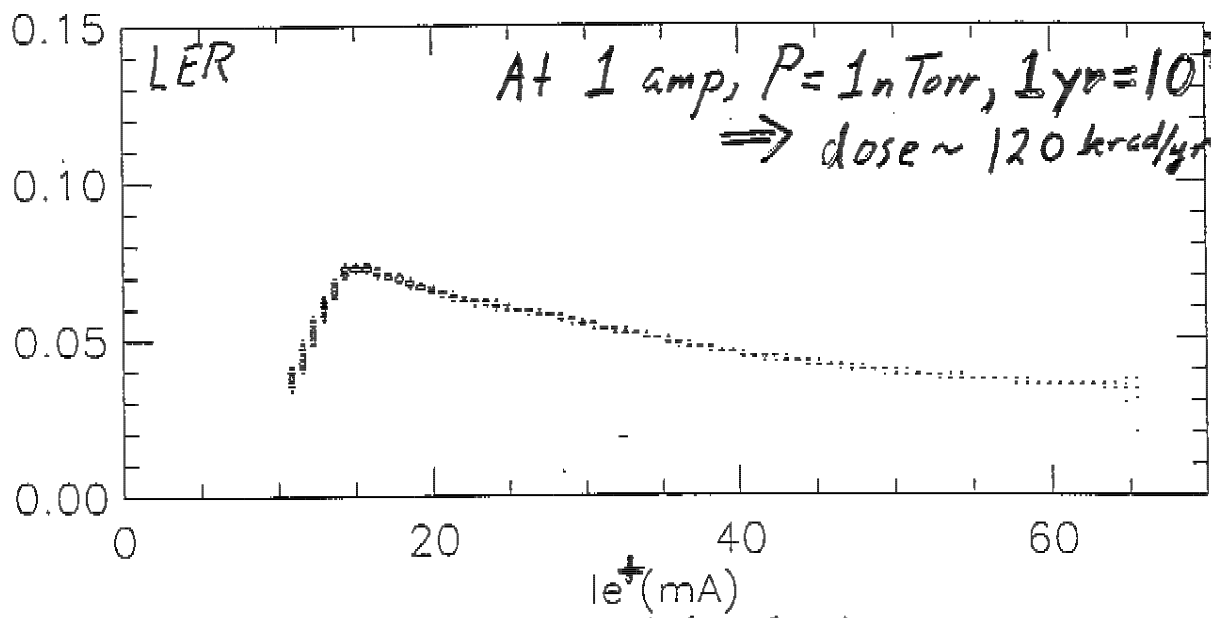
Expect Particle Backgrounds scale as $P \cdot I$

Summary of Results for Steady State Running

(x1.5 differences for other diodes)

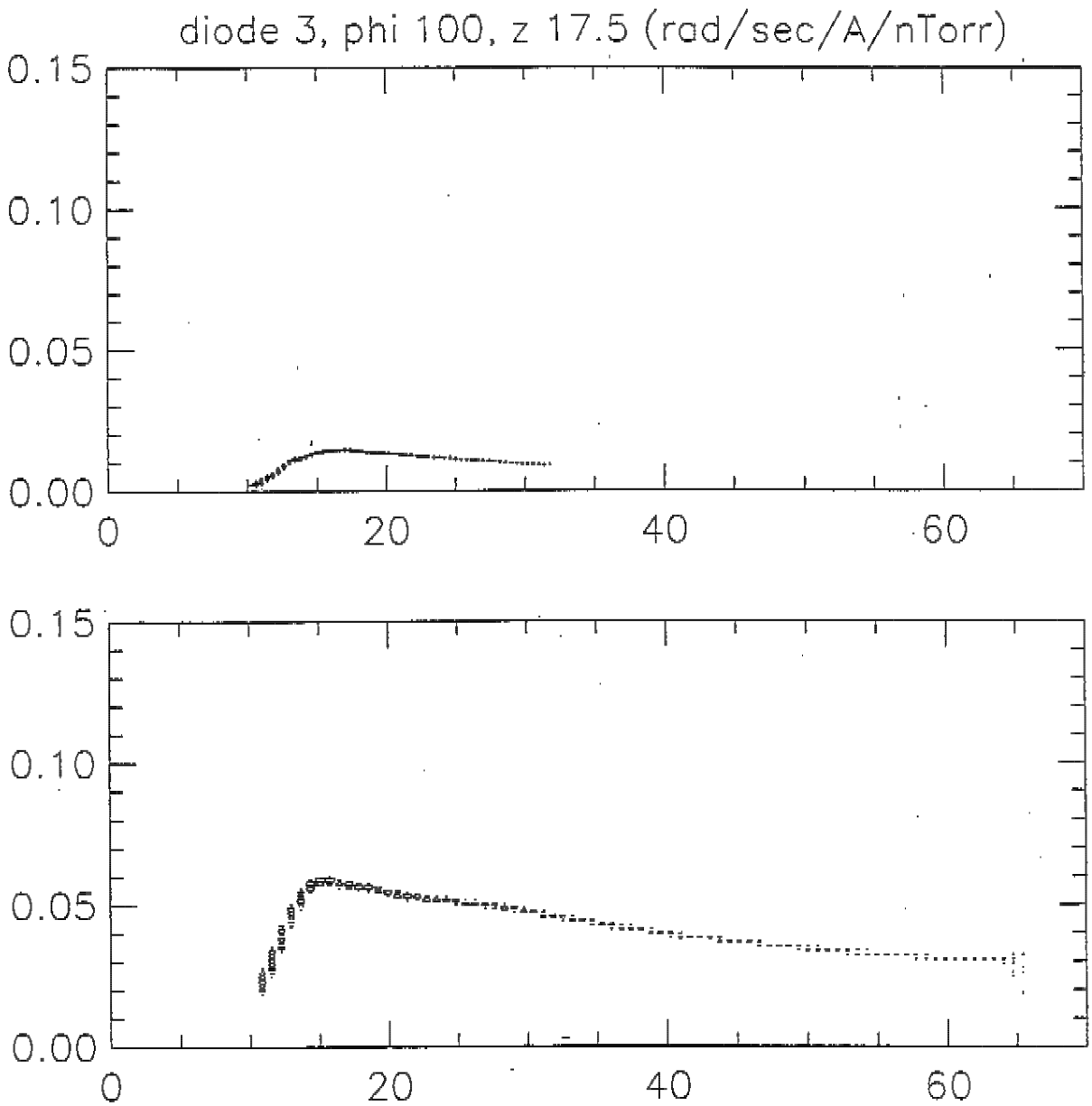
Diode 1 (rad/sec/A/nTorr) vs I(mA)

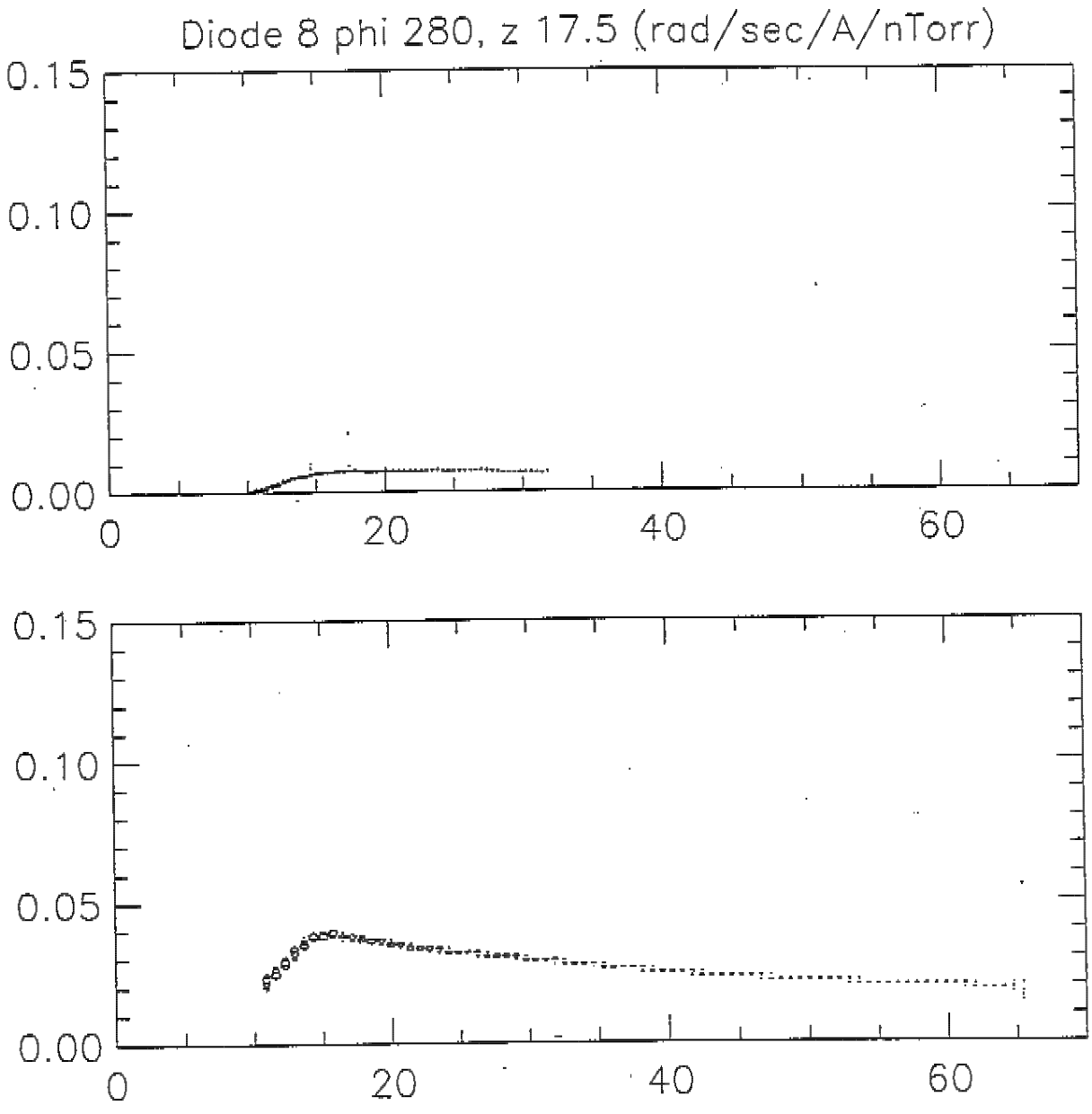


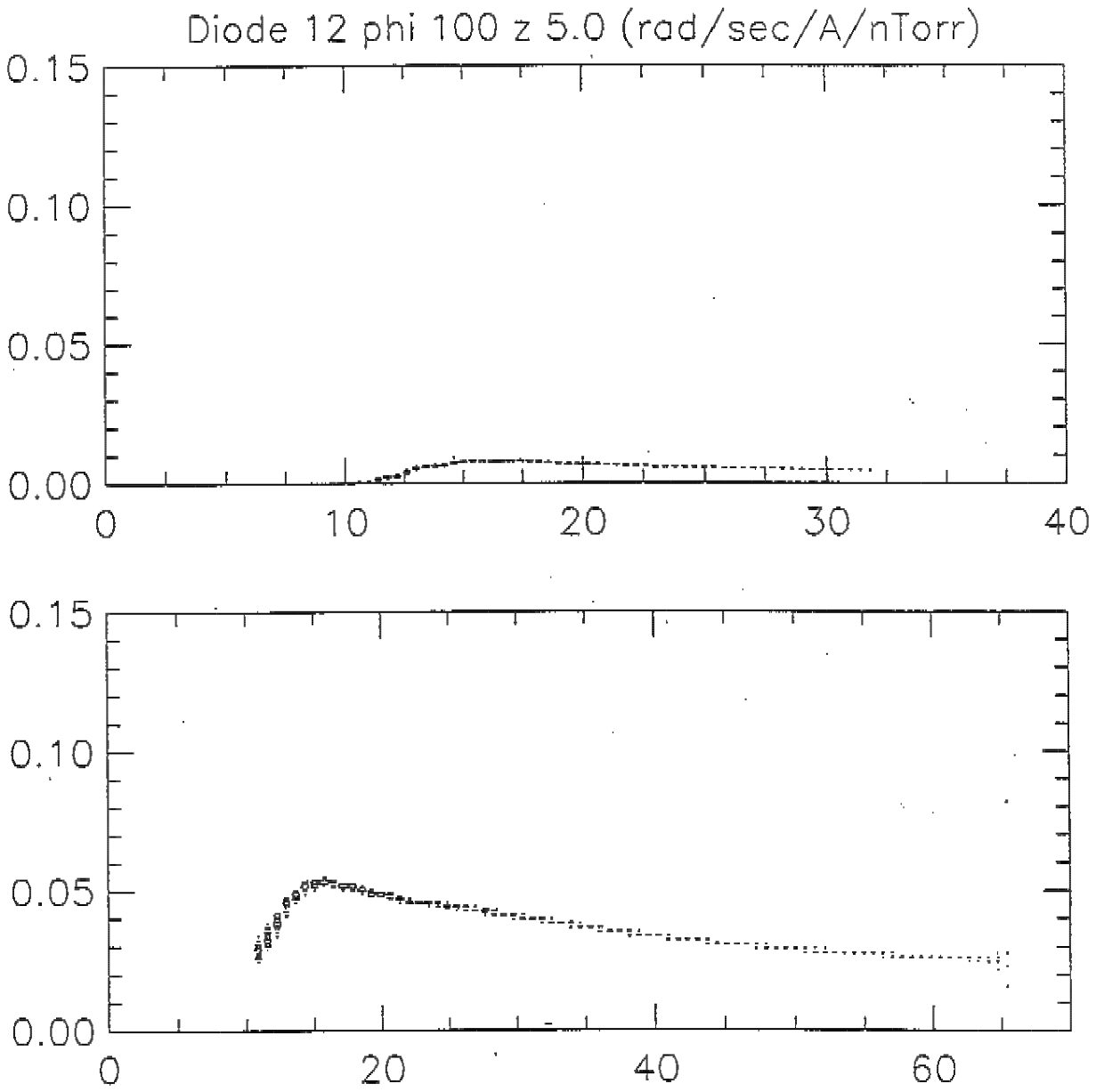


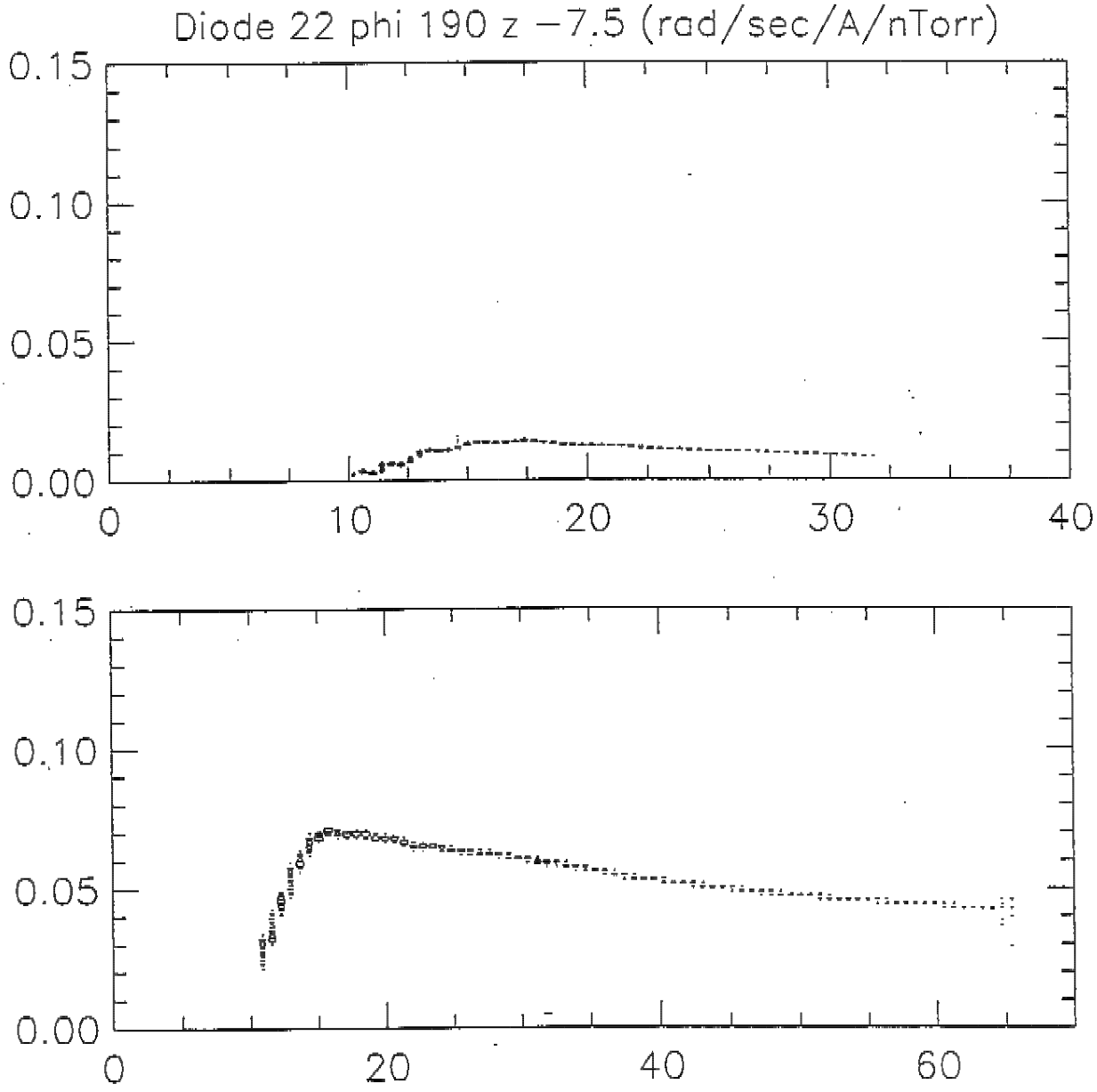
Maximum dose for VA1 SVX readout chip is 200krad

⇒ These are acceptable results *if* this dynamic vacuum pressure can be achieved.


diode 3, phi 100, z 17.5 (rad/sec/A/nTorr)
0.15
0.10
0.05
0.00
0
20
40
60
0.15
0.10
0.05
0.00
0
20
40
60

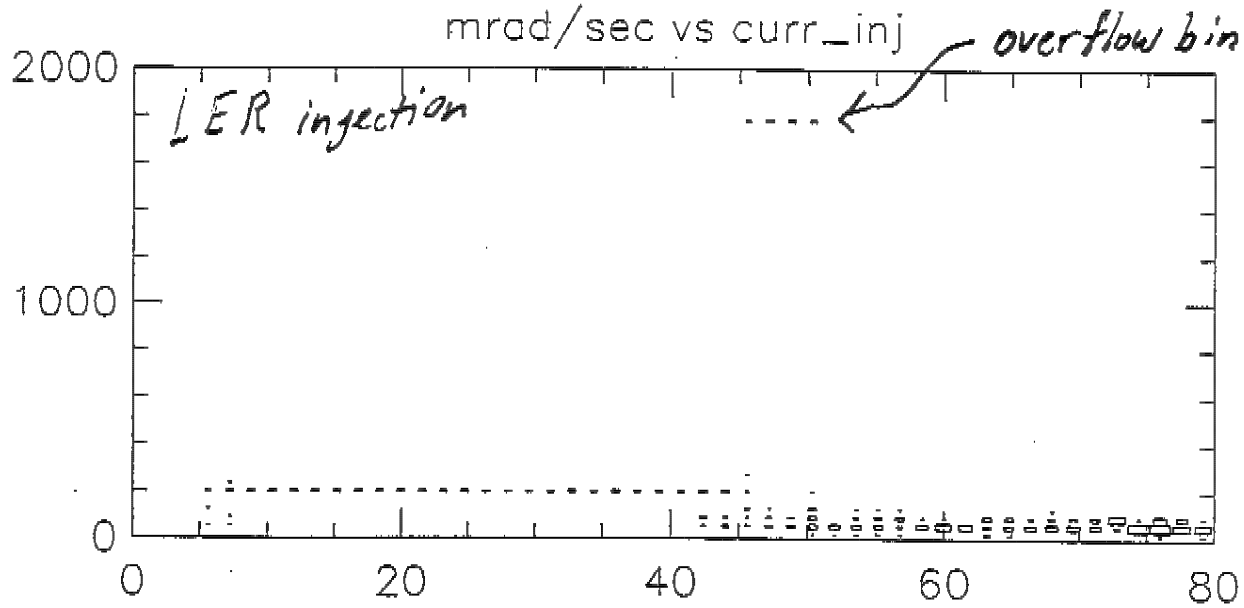

Diode 8 phi 280, z 17.5 (rad/sec/A/nTorr)
0.15
0.10
0.05
0.00
0
20
40
60
0.15
0.10
0.05
0.00
0
20
40
60

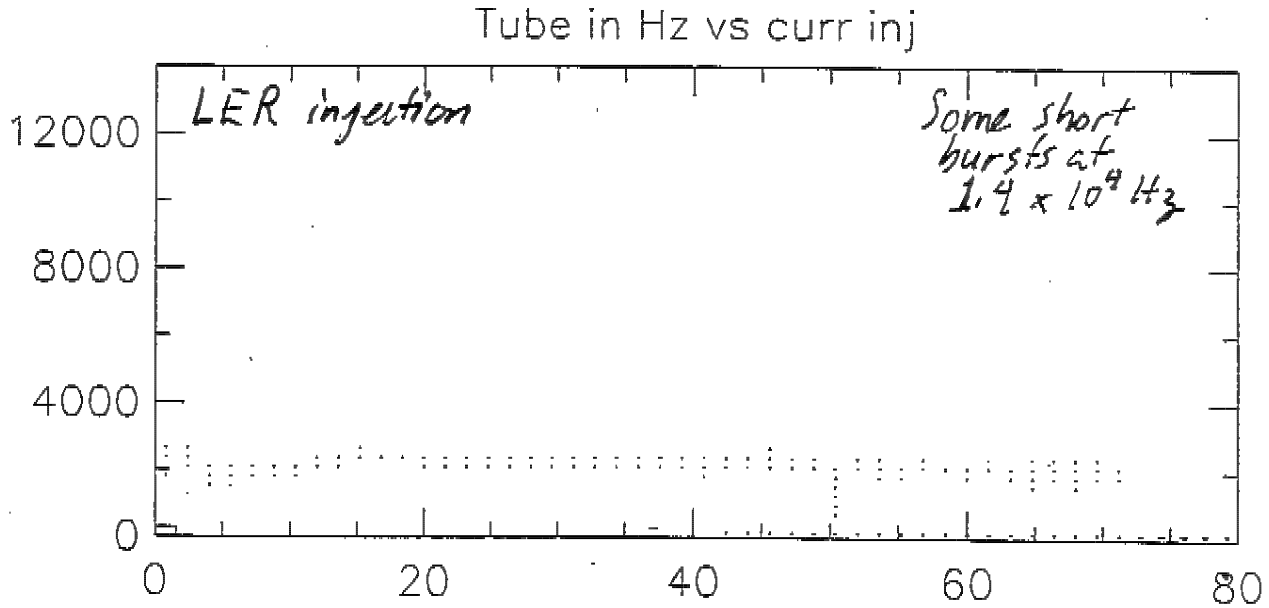

Diode 12 phi 100 z 5.0 (rad/sec/A/nTorr)
0.15
0.10
0.05
0.00
0
10
20
30
40
0.15
0.10
0.05
0.00
0
20
40
60


Diode 22 phi 190 z −7.5 (rad/sec/A/nTorr)
0.15
0.10
0.05
0.00
0
10
20
30
40
0.15
0.10
0.05
0.00
0
20
40
60

- Several diodes destroyed during injection.
- Other diodes have such large leakage currents that the readout is out of range

LER injection

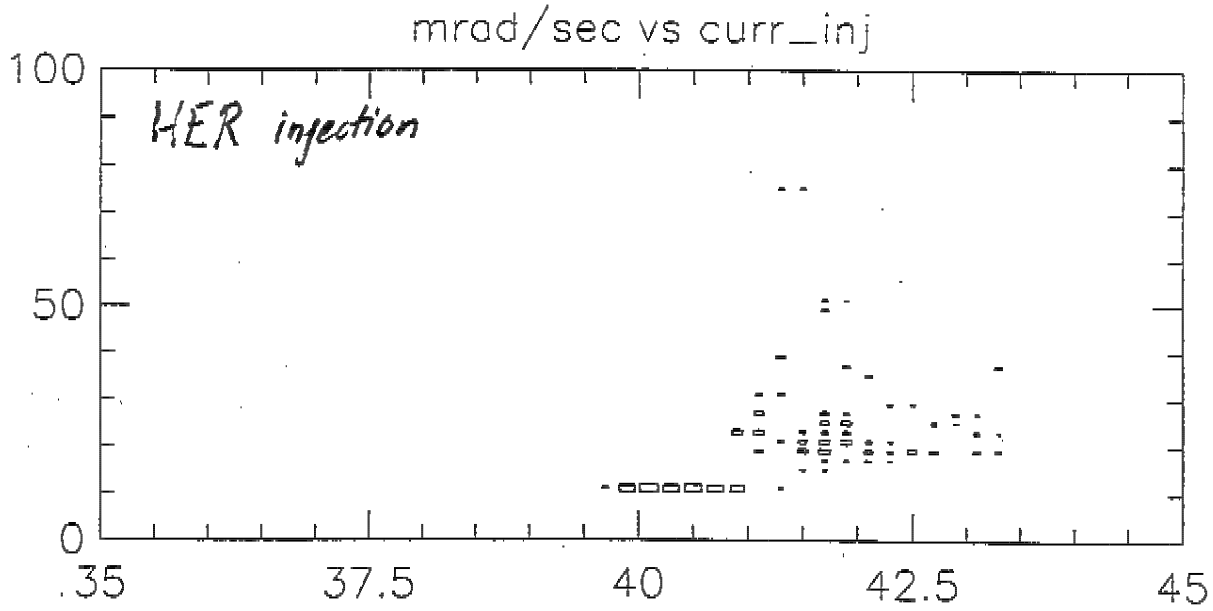


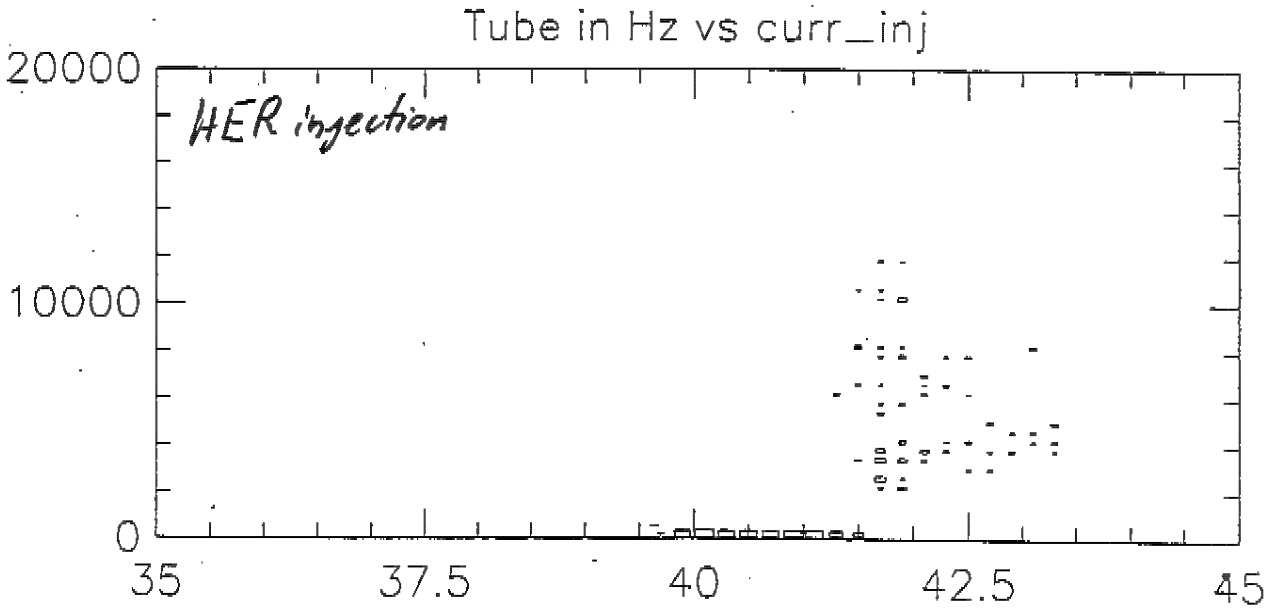


- Most of the integrated dose accumulated by BEAST, so far, ~80 krad is from injection and machine experiments.

- 1 diode killed during early HER injection

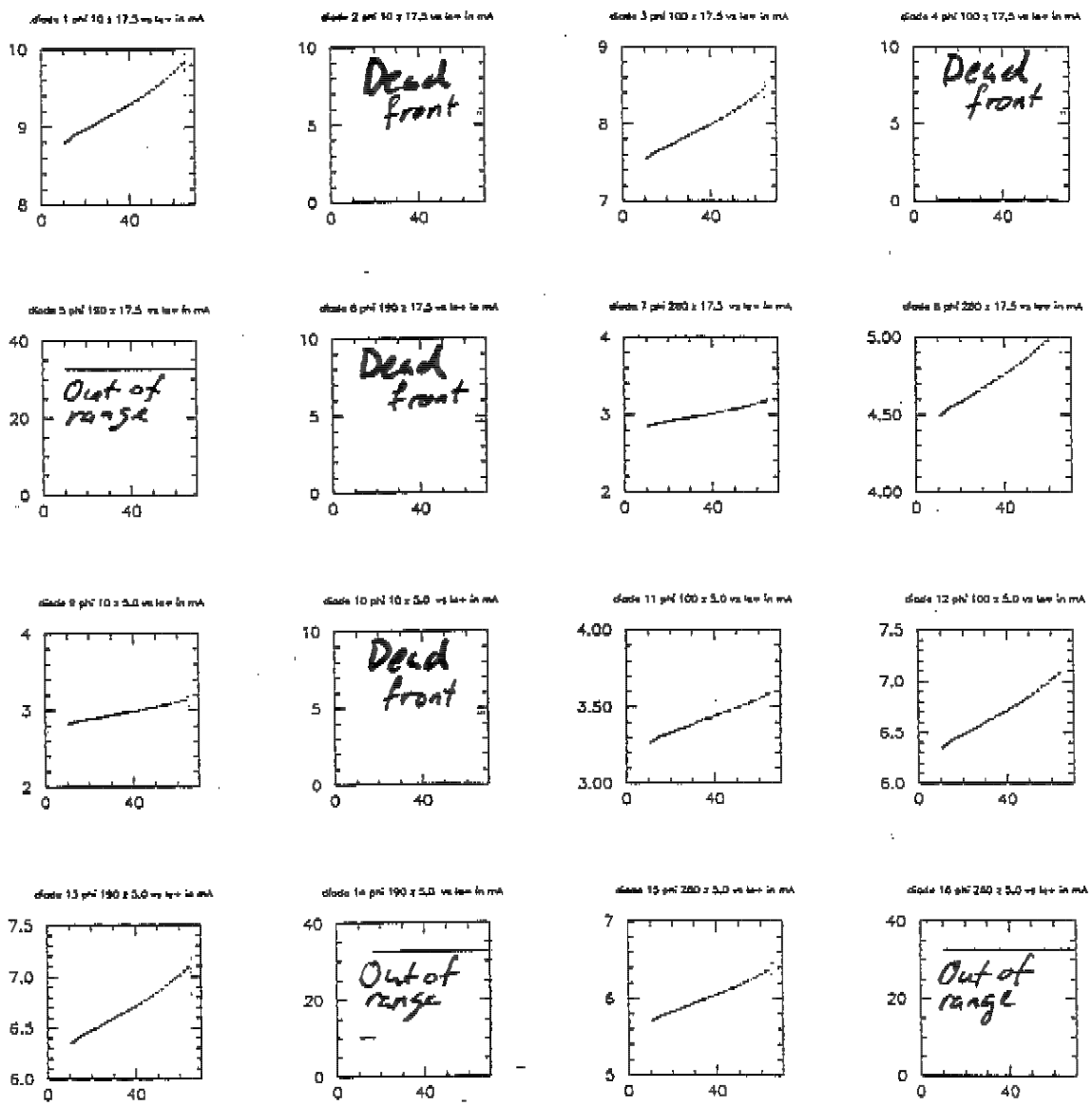
HER injection





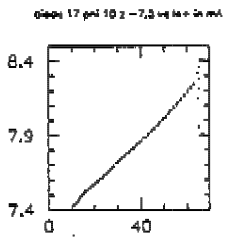
Status of Diode Detectors p.1

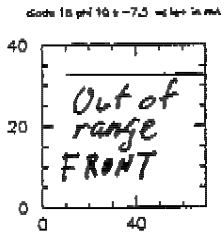
LER run with diodes biased at 10V (instead of nominal 60V).

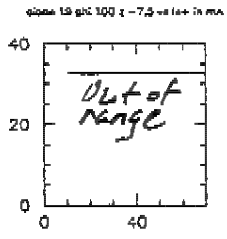


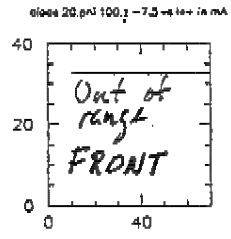
Injection responsible for diode deaths and large leakage currents.

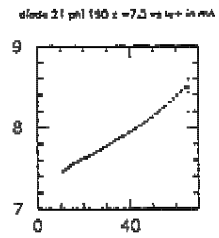
Status of Diode Detectors p. 2

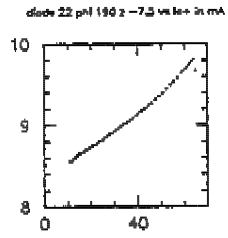


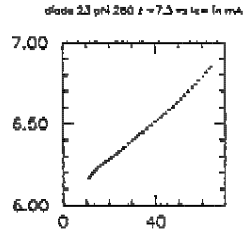


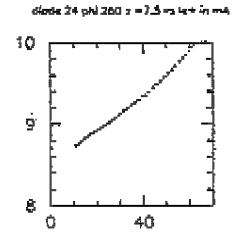






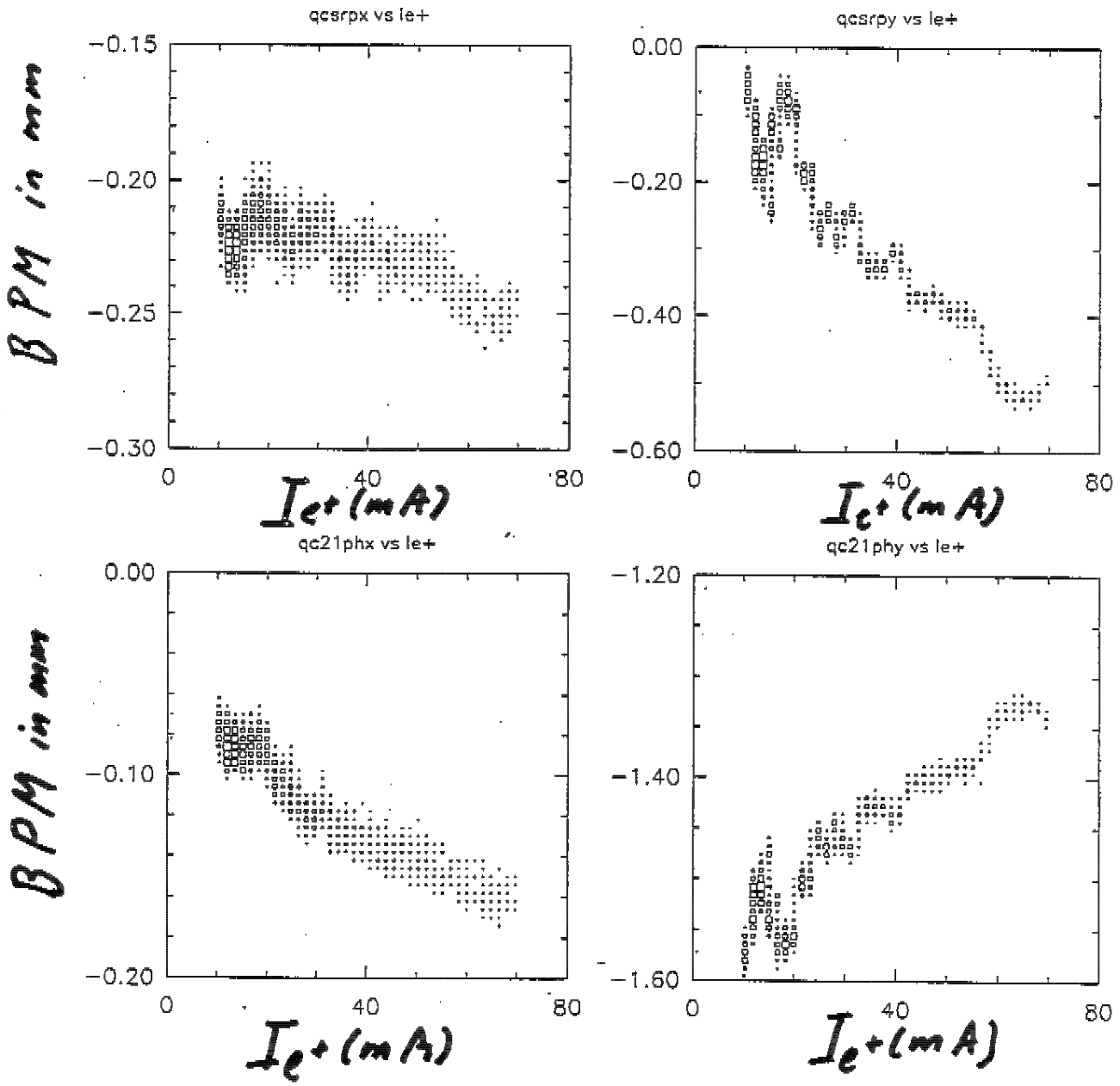






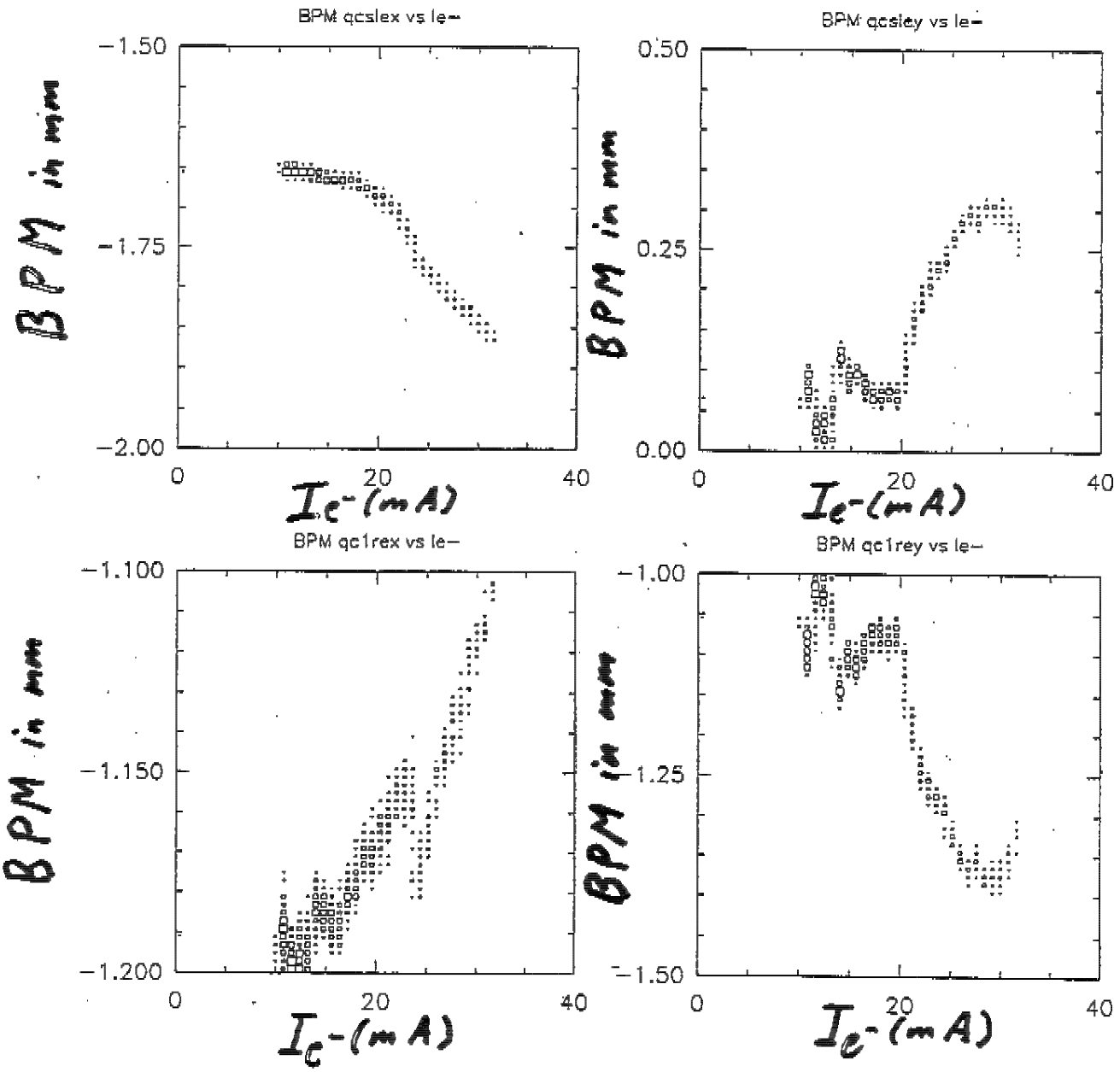
"Orbit Drift"

LER run

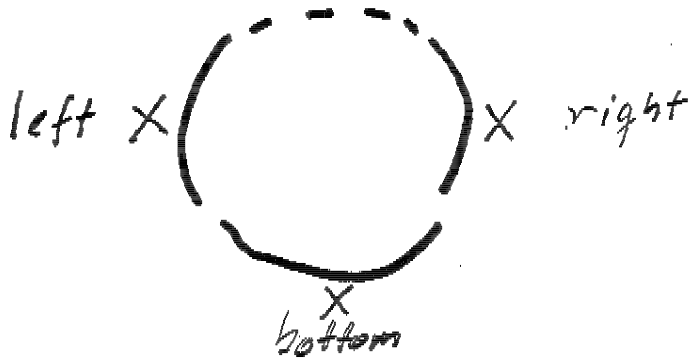


"Orbit Drift"

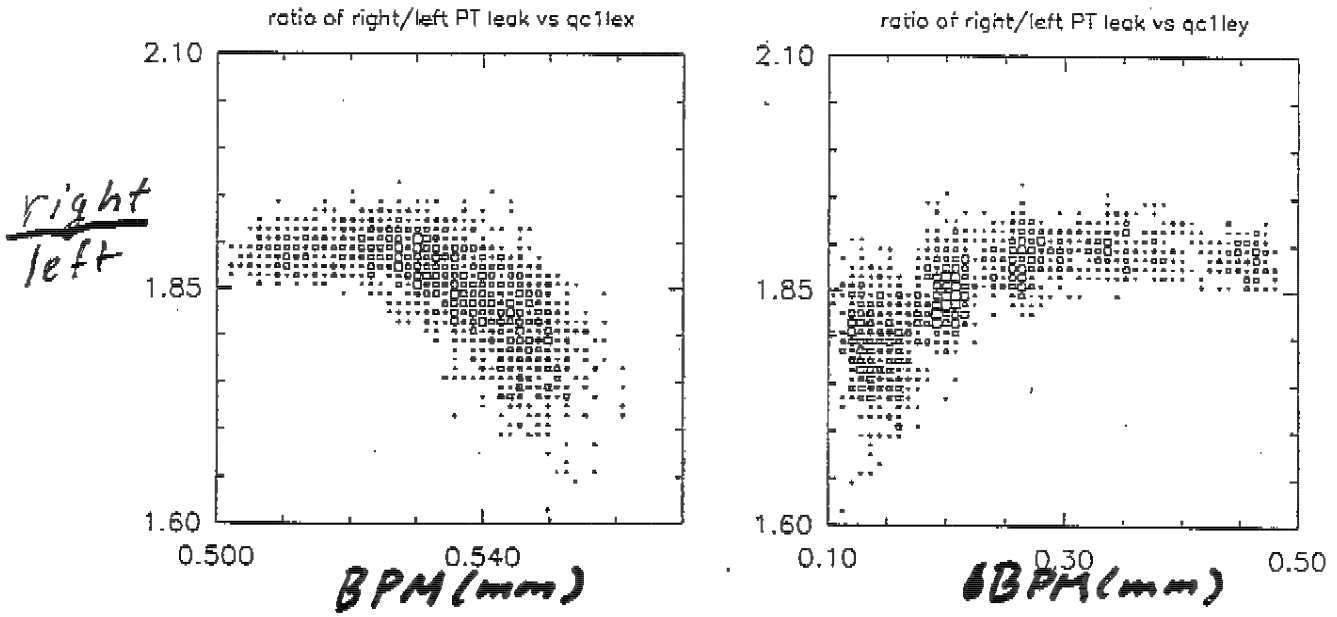
HER run

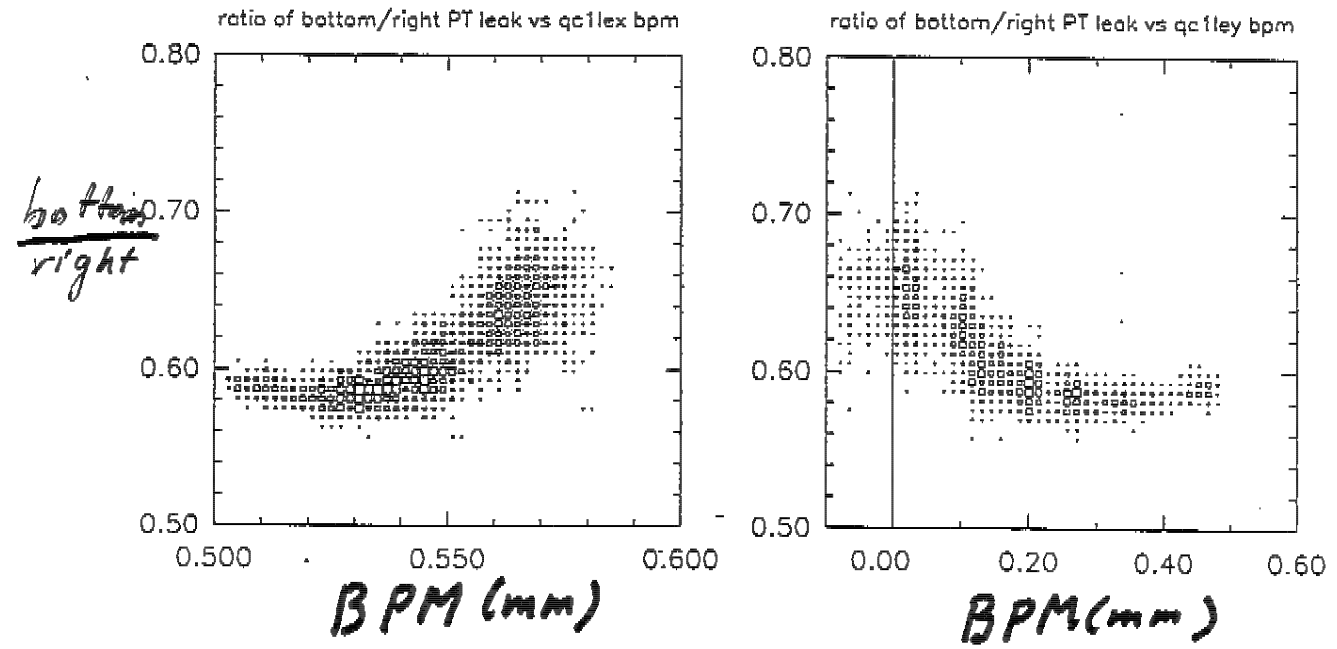


Effect of orbit bump on beam angles



LER run





Particle Background Simulation

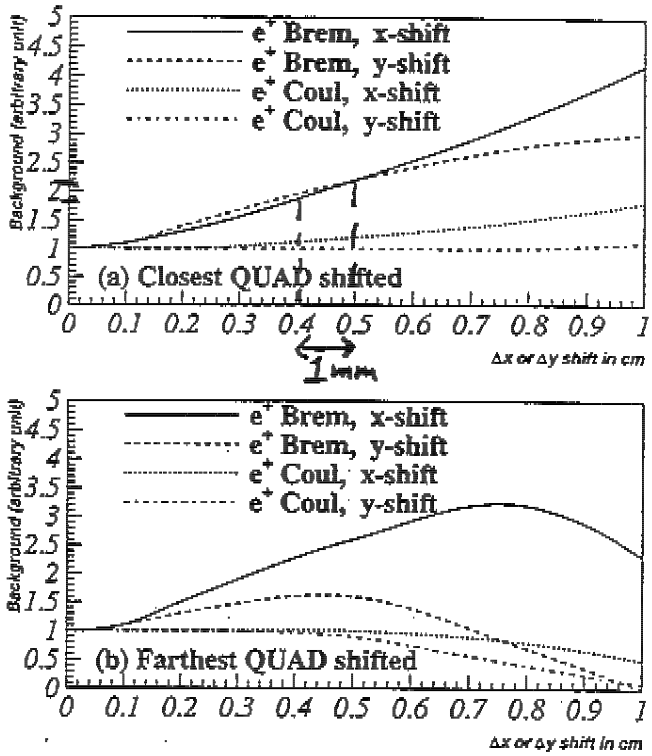


Figure 5: Increase by factor in background hit rate as a function of x- or y-shift in quadrupoles for LER; (a) when nearest quadrupole from BELLE is shifted, (b) when farthest quadrupole is shifted.

collide, this will be the first detector to observe the Bhabhas, and therefore give direct information about the luminosity.

5.3 Proportional Chambers

Proportional chambers are being made at UH. A prototype has already been made and tested. Aluminum tubes will hold negative high voltage, and 50 μm gold-plated tungsten wires will serve as the anode. Basic circuit of the measurement is given in Fig. 9. The DC current is measured by looking at the impedance across the high voltage source. Signal from wires can be amplified

Summary and Conclusion

Backgrounds during steady-state running will be acceptable if the vacuum chamber is baked to a level where dP/dI(dynamic pressure) is 1 nTorr at 1 amp.

Backgrounds during injection are large and are intolerable for the detector. The problem is especially bad for the LER.

Current conditions are not acceptable for detector roll-in. (e.g. Diodes have been killed, and have large leakage currents. Drift tubes cannot be operated at high gain).