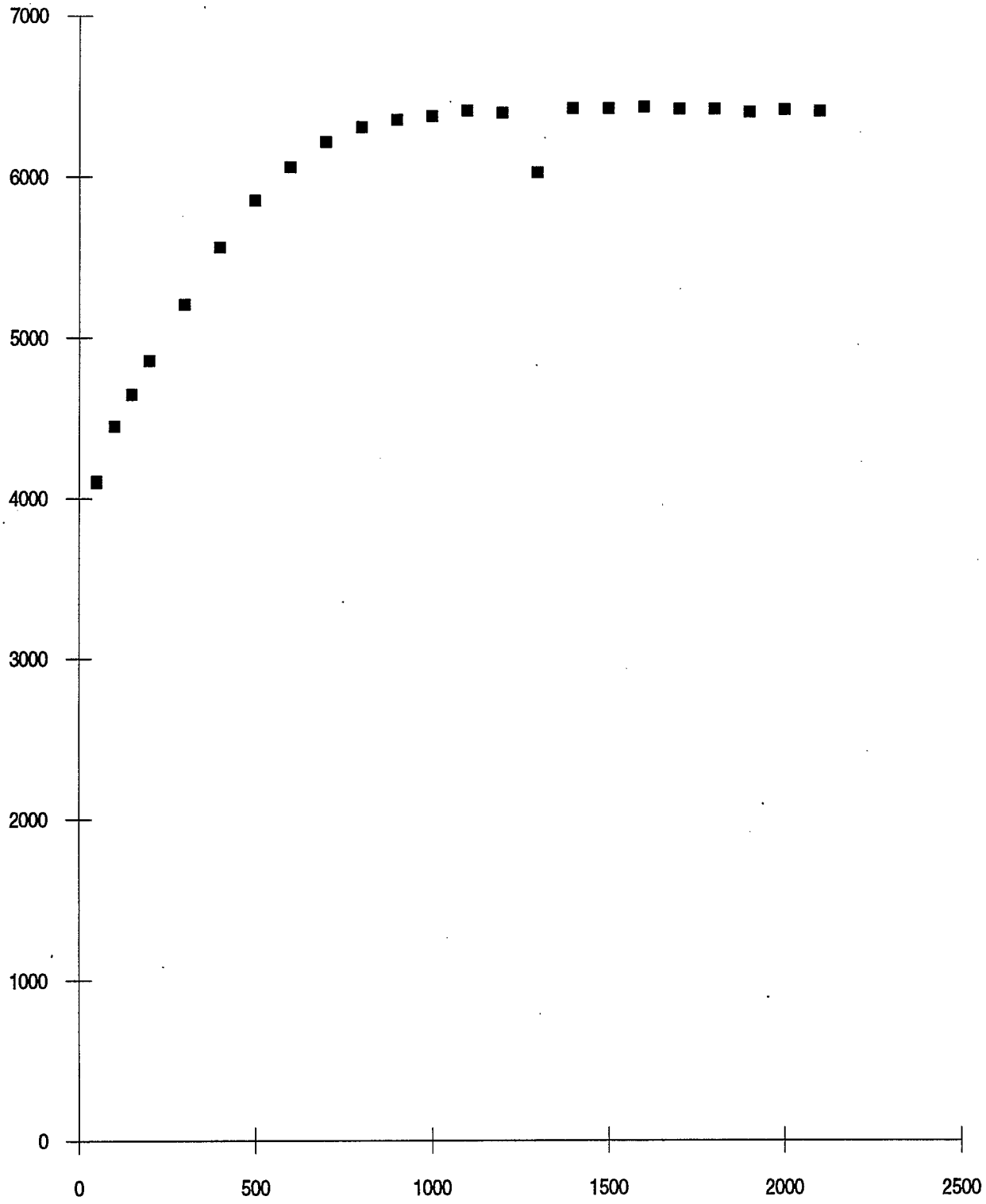
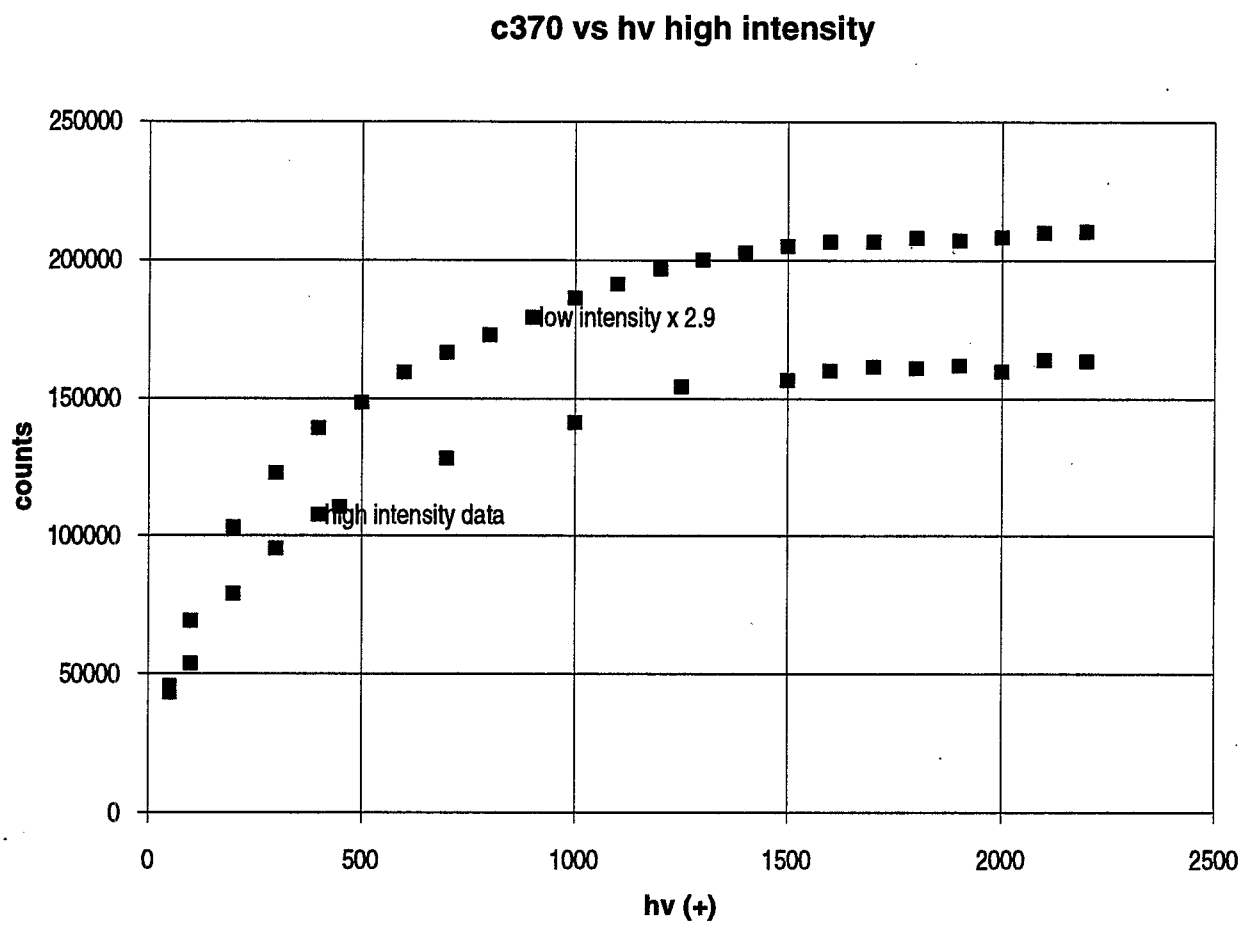
1 Addendum to AGS Studies Report Number 342

I Hung Chiang has been kind enough to provide the attached figures showing the voltage curves for a set of the ion chambers. For more information see the conclusions of AGS Studies Report Number 342.

Kevin Brown

2GEV_96.XLS Chart 2




c370 vs hv high intensity
250000
200000
150000
100000
50000
0
counts
0
500
1000
1500
2000
2500
hv (+)
low intensity x 2.9
high intensity data

AGS/AD/AGS Studies Report No. 342
February 21, 1996

AGS Complex Machine Studies

(AGS Studies Report Number 342)

Performance of SEB Ion Chamber During FY96 11.8 GeV/c/n Au79+ Run

Study Period: November 29, 1995
Participants : Kevin Brown
Reported By : Kevin Brown
Machine/Beam : AGS, 11.8 GeV/c/n Au 79+
Tools : HIP Ion chambers, Extraction loss monitors
Aim : Test Linearity of various Ion Chambers

1 Introduction

The purpose of this studies report is to provide documentation of the performance of the intensity monitoring devices used for Heavy Ion SEB during the high energy run. Presented are figures of the linearity of the various devices and a position scan of the beam on the C10 Ion Chamber. All the devices show to be very linear over the range of intensities which we ran at this year, although C10 and the A290 Ion Chambers begin to roll off at the higher intensities. A position scan of the C10 ion chamber shows a definite position dependence on the output of the device. The effect is approximately an 8 % effect.

2 Study Description

Linearity data was collected using GPM and represents the intensity variations over a short period of time (data was just collected, nothing was adjusted to lower or raise the intensity). The scan of C10 was done by changing F10 current and collecting the data via GPM.

3 Results

Figures 1 - 8 show the results. Short descriptions:

1. Linearity curve of C10 ion chamber.
2. C10 Ion Chamber Response versus F10 current.
3. A290 Linearity
4. B387 Linearity
5. C370 Linearity
6. F5 Loss Monitor Linearity
7. F10 Loss Monitor Linearity
8. RLM sum Loss Monitors Linearity

All the Ion Chambers show rather significant offsets. The C10 begins rolling off at about 170 x 10^{6} ions. The A290 begins rolling off at about 30 x 10^{6} ions. All the Ion Chambers run at about 450 volts and physically are the same as SEC's, but that have been filled with Argon gas. The differences in where the rolling off occurs is most likely due to different beam sizes passing through the devices.

The structure in the C10 Ion Chamber, as seen in figure 2, is unexpected. There is as yet no explaination for it.

4 Conclusions

In general the Ion Chambers behaved very well. Two concerns for future runs should be better nulling of the offsets and attempting to eliminate the rolling off seen at high intensities.

In discussions with I Hung Chiang I learned that in general the ion chambers do not run on the platuea of the voltage curve. They typically platuea in a range from 1000 volts to 1500 volts. The plan for the next heavy ion run is to have higher voltage power supplies available for C10 and A290, at least.

Figure 1: C10 Ion Chamber vs Intensity

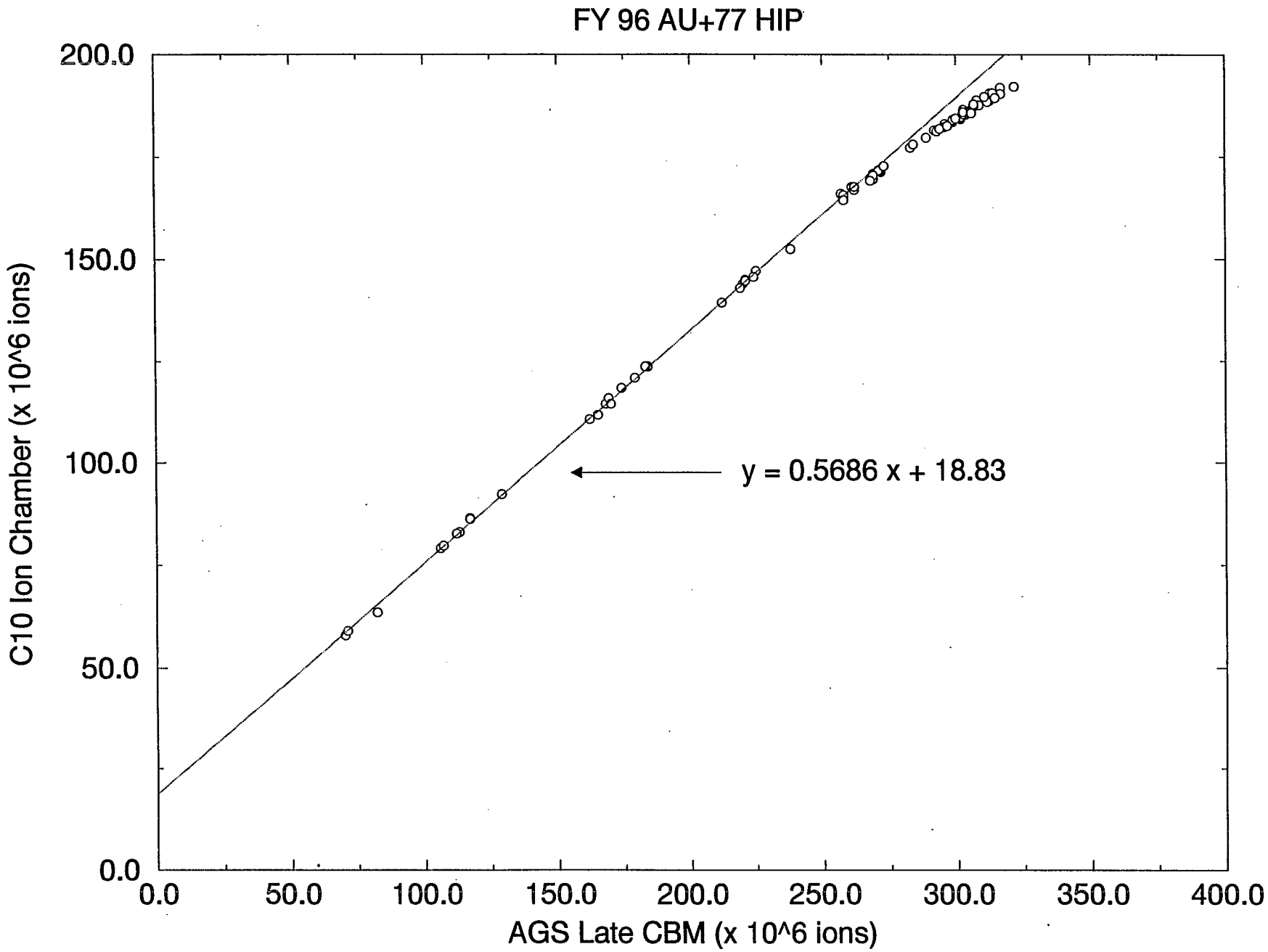


Figure 2: C10 Ion Chamber Response vs

Position of Beam On C10; FY 96 Au+77 SEB

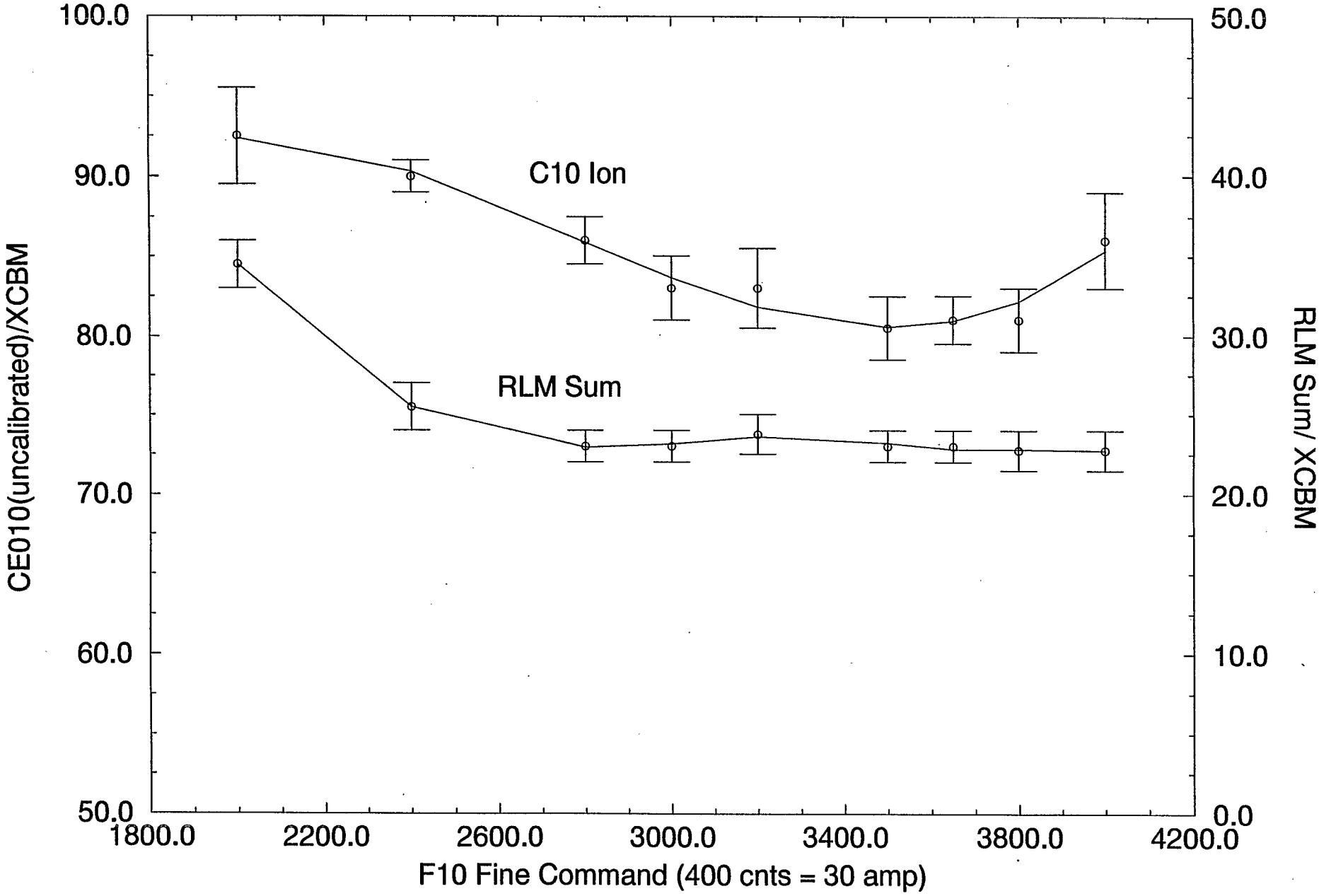


Figure 3: A290 Ion Chamber vs Intensity

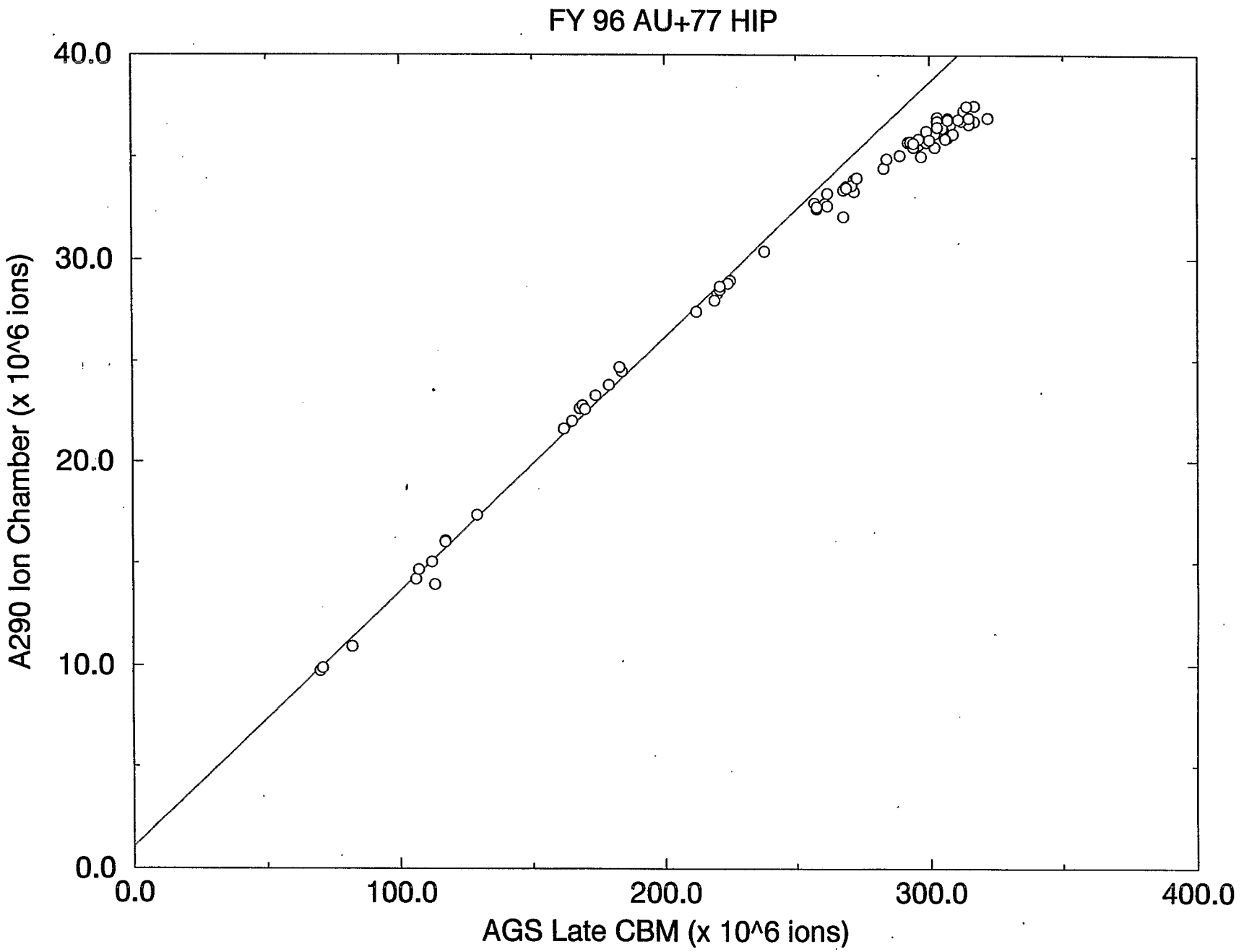


Figure 4: B387 Ion Chamber vs Intensity

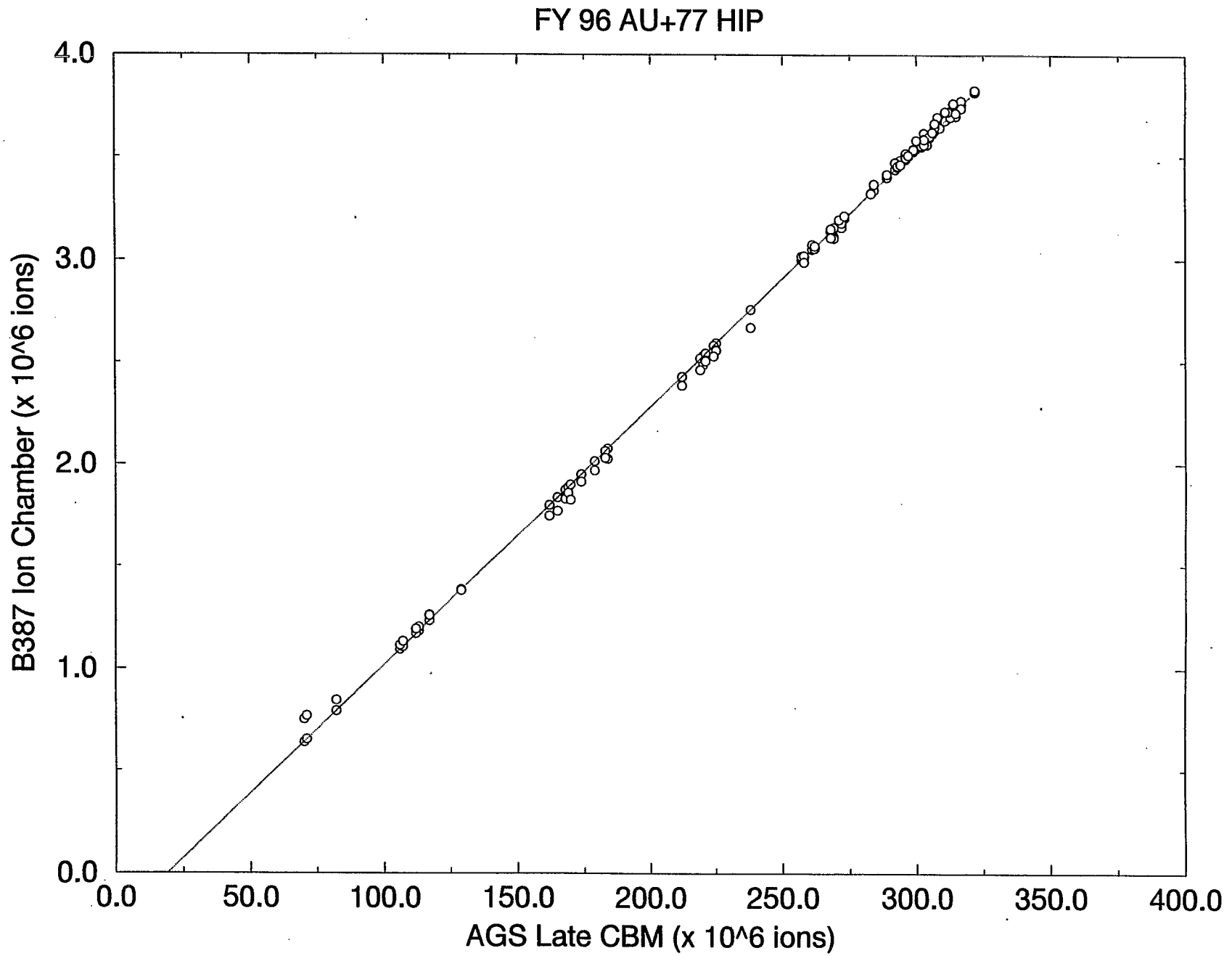


Figure 5: C370 Ion Chamber vs Intensity

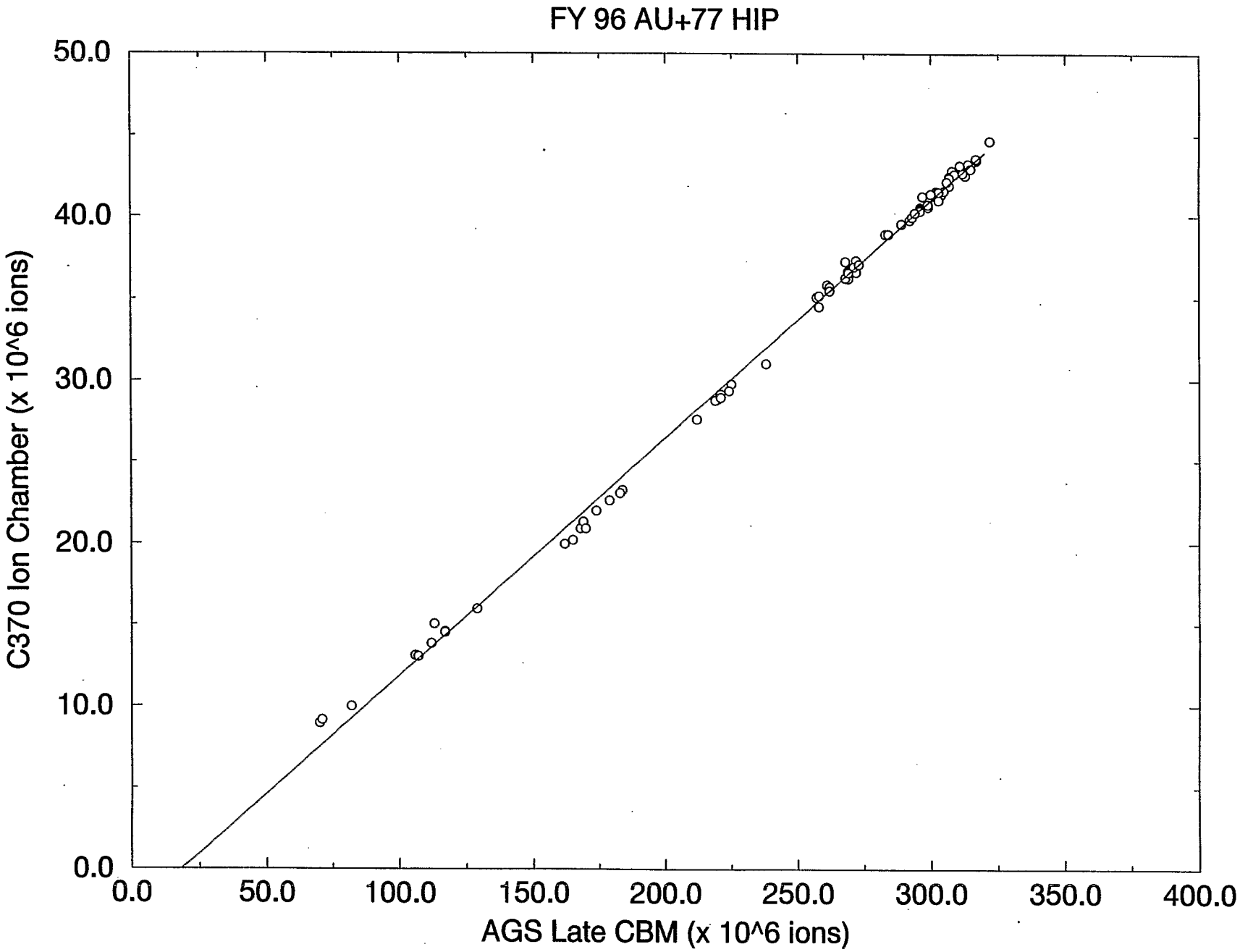


Figure 6: F5 Losses vs Intensity

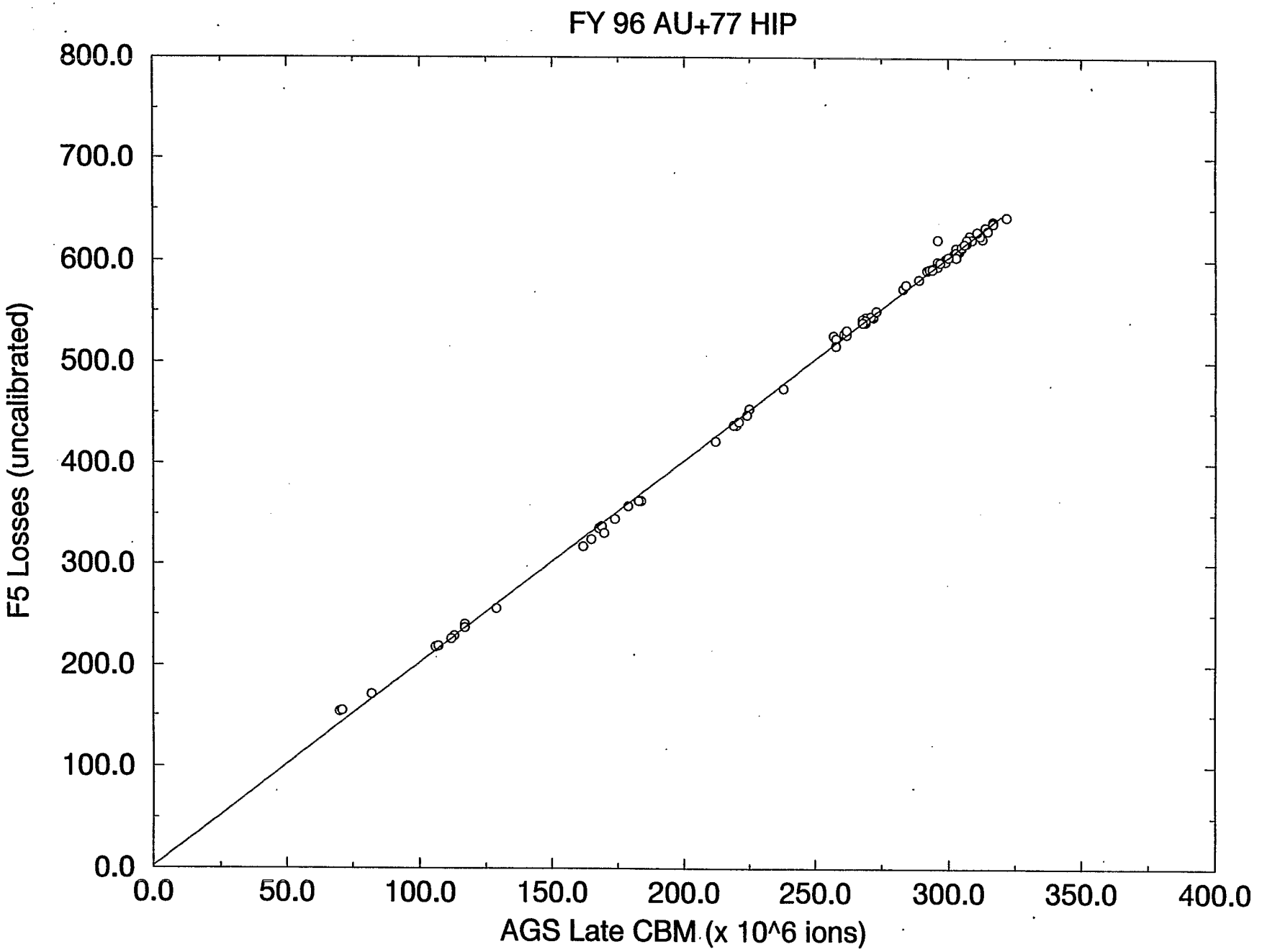


Figure 7: F10 Losses vs Intensity

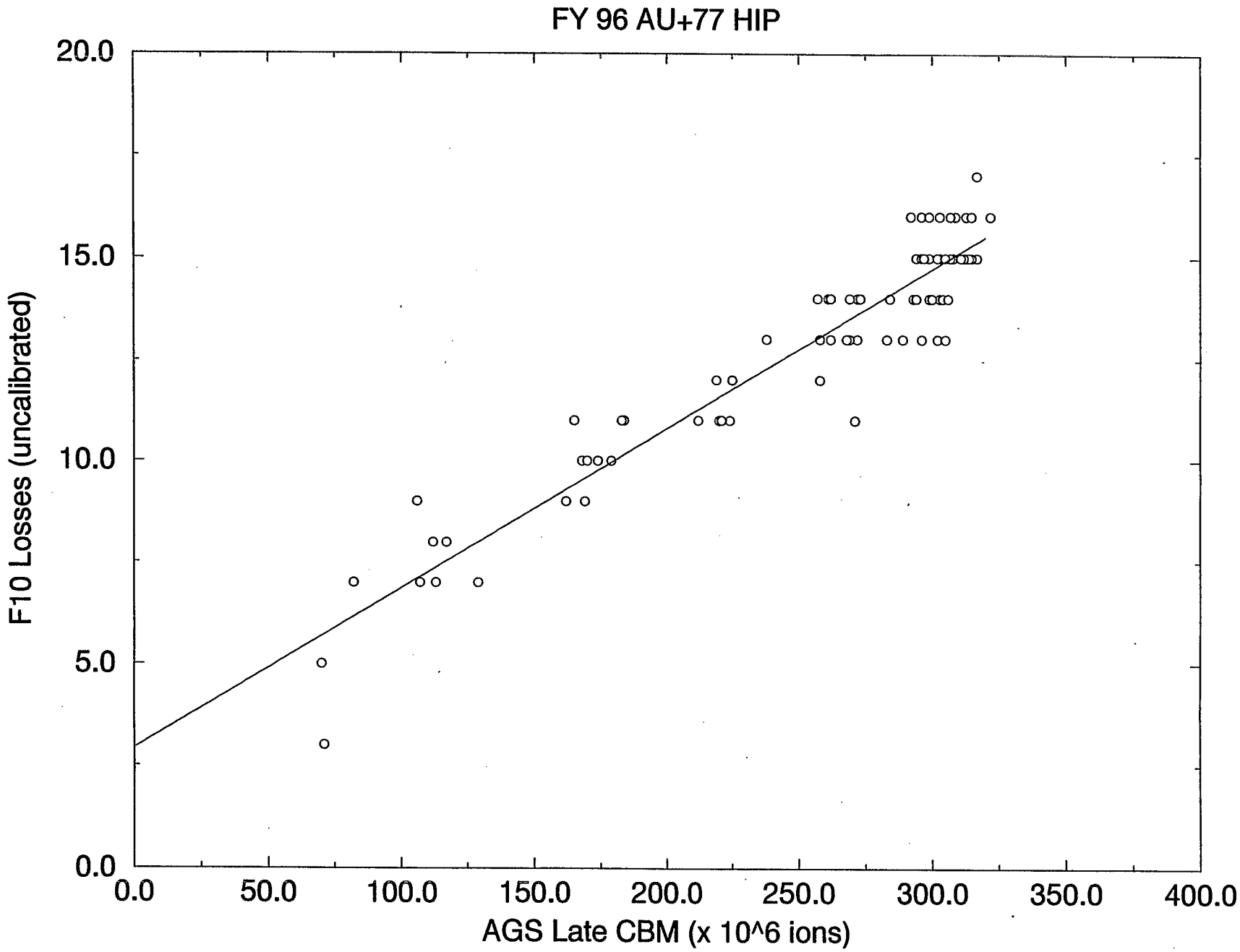
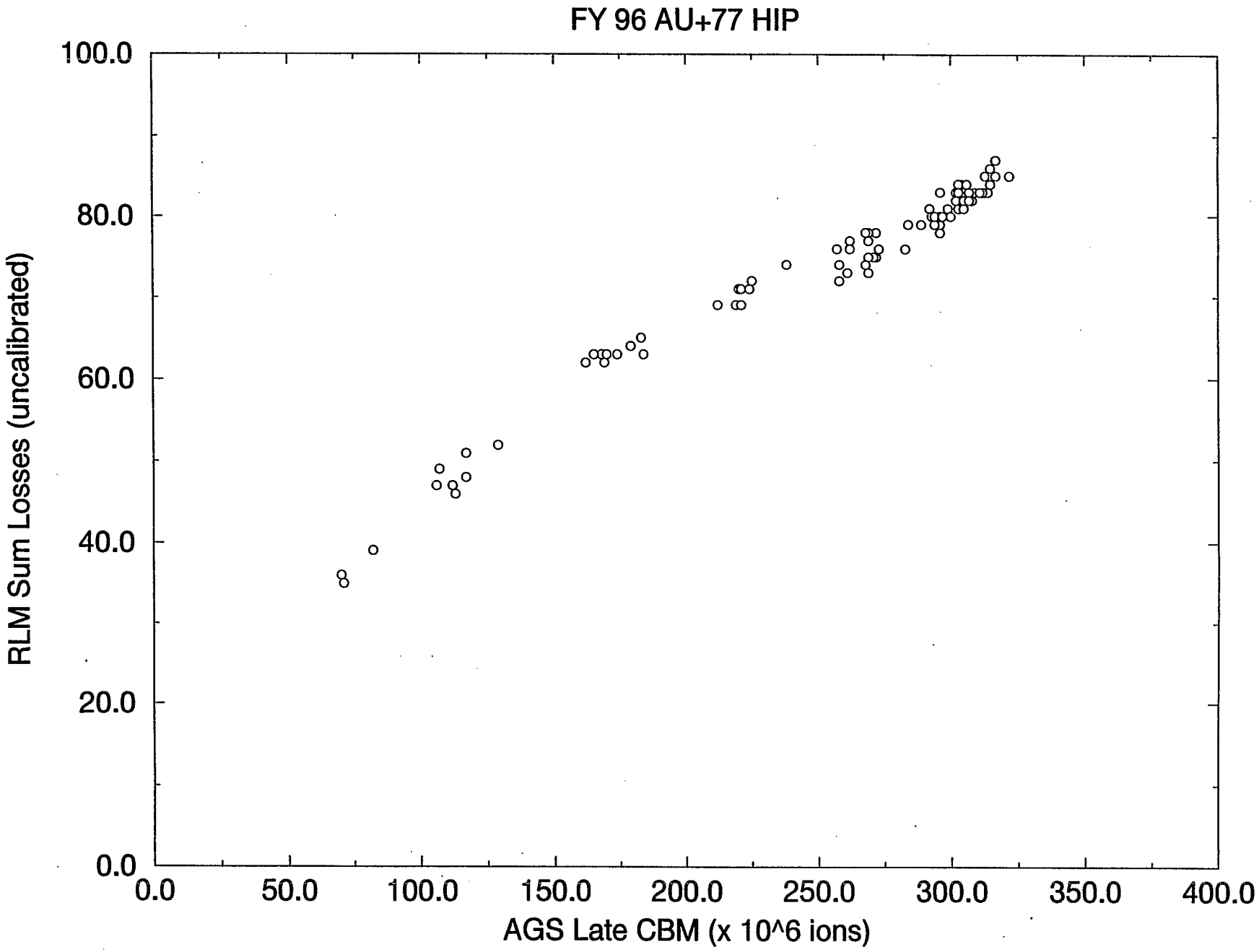



Figure 8: RLM Sum Losses vs Intensity