Update on SIDIS Gas CherenkovS

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→Recent field measurements on H8500C-03

SoLID Meeting, March 2 2012

Field Measurements since the Feb. 3-4 SoLID Collaboration Meeting

→Recent field measurements on H8500C-03

I have shown at the last collaboration meeting field measurements from scope readings

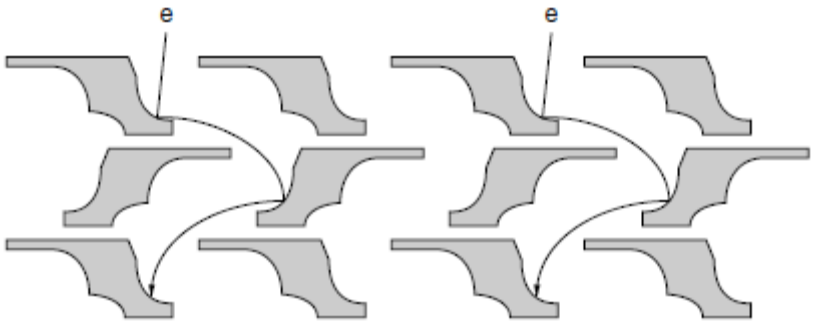
Now I'll show more accurate field measurements from ADC data

Photon Detector: H8500C-03

Why this one over other PMTs?

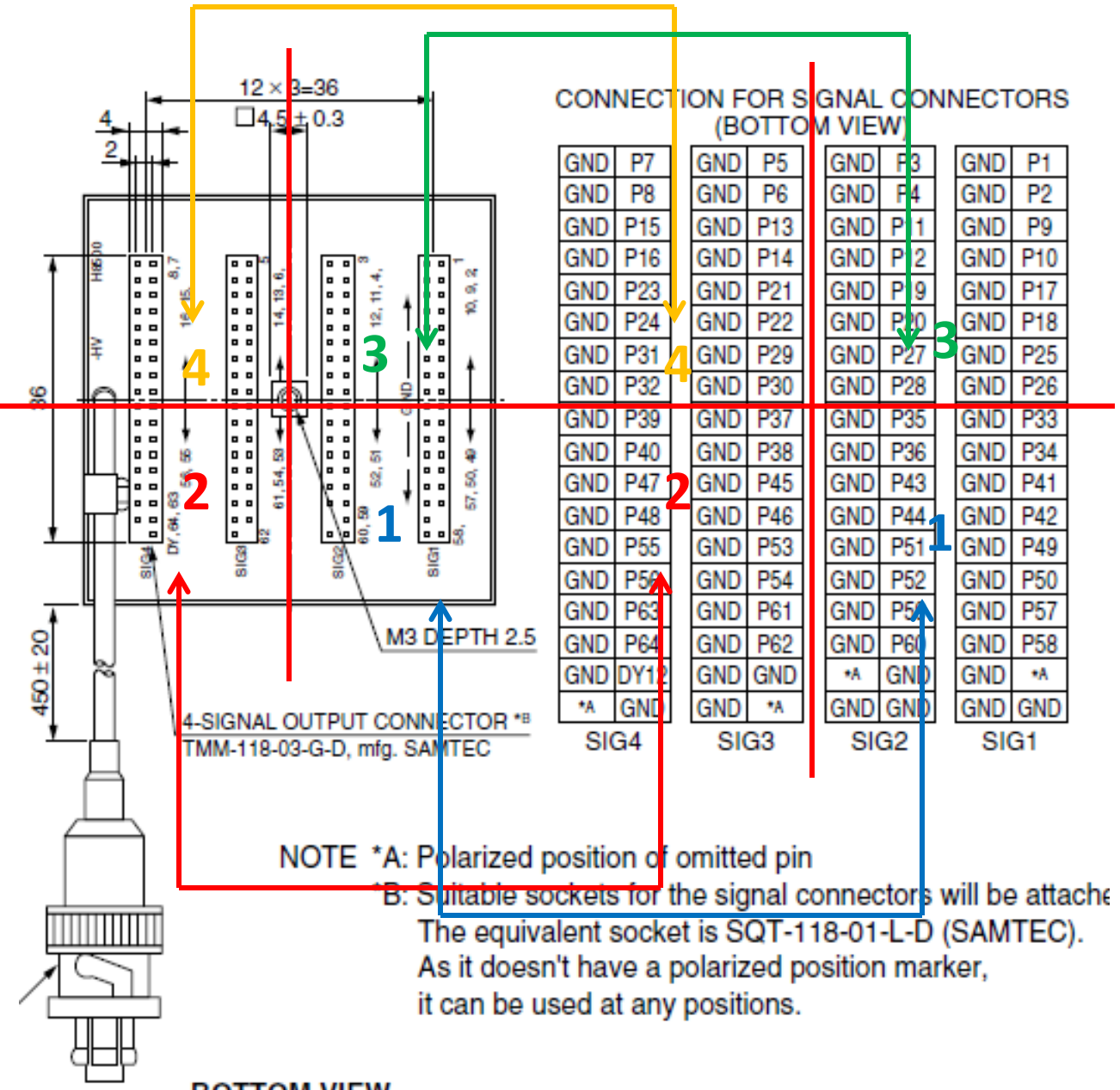
→ Field resistant

→ Suitable for tiling

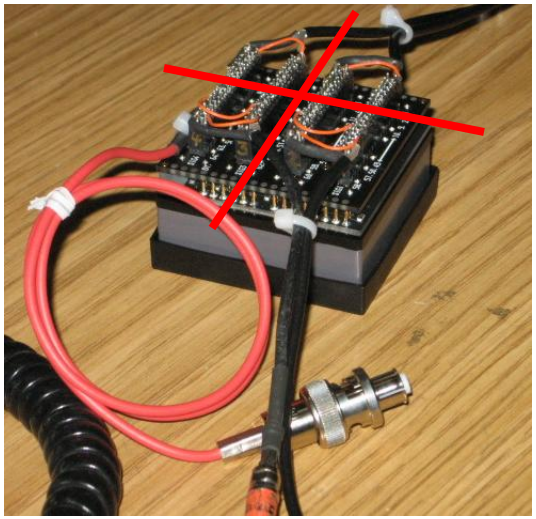


Parameter		H8500C	H8500D	H8500C-03	H8500D-03
Spectral Response		300 to 650		185 to 650	
Peak Wavelength		400			
Photocathode Material		Bialkali			
Window	Material	Borosilicate glass		UV glass	
	Thickness	1.5			
Dynode	Structure	Metal channel dynode			
	Number of Stages	12			
Number of Anode Pixels		64 (8 × 8 matrix)			
Pixel Size / Pitch at Center		5.8 × 5.8 / 6.08			
Effective Area		49 × 49			
Dimensional Outline (W × H × D)		52 × 52 × 27.4			
Packing Density (Effective Area / External Size)		89			

H8500C-03: Output



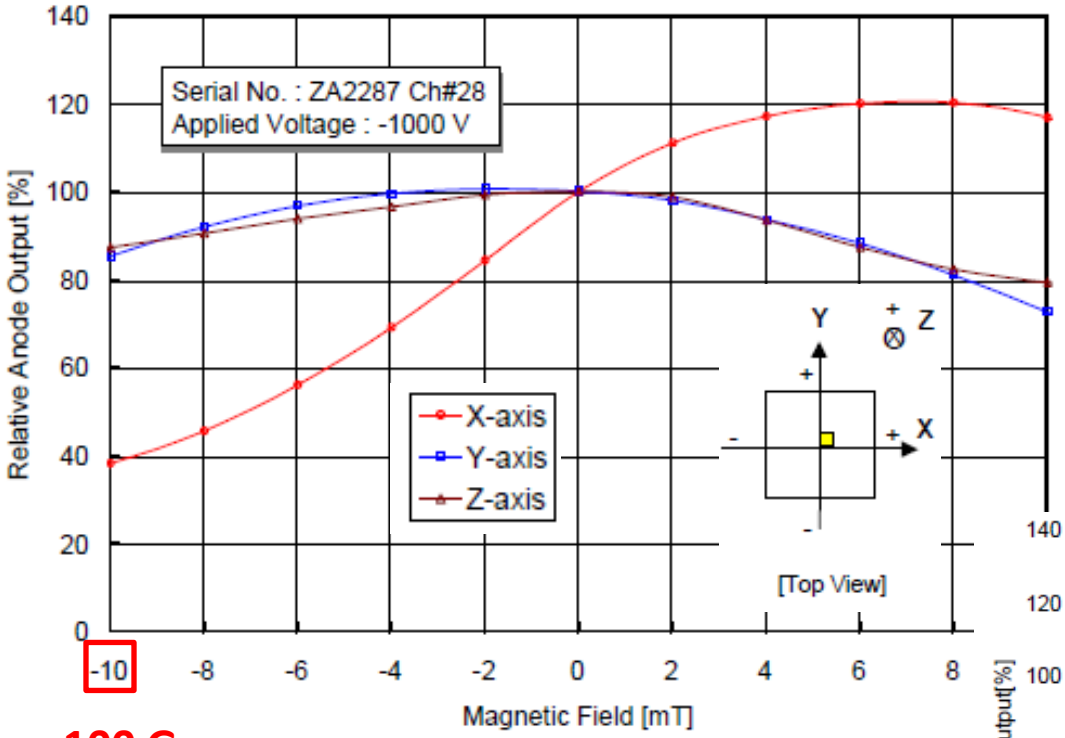
SIG4		SIG3		SIG2		SIG1	
GND	P7	GND	P5	GND	P3	GND	P1
GND	P8	GND	P6	GND	P4	GND	P2
GND	P15	GND	P13	GND	P11	GND	P9
GND	P16	GND	P14	GND	P12	GND	P10
GND	P23	GND	P21	GND	P19	GND	P17
GND	P24	GND	P22	GND	P20	GND	P18
GND	P31	GND	P29	GND	P27	GND	P25
GND	P32	GND	P30	GND	P28	GND	P26
GND	P39	GND	P37	GND	P35	GND	P33
GND	P40	GND	P38	GND	P36	GND	P34
GND	P47	GND	P45	GND	P43	GND	P41
GND	P48	GND	P46	GND	P44	GND	P42
GND	P55	GND	P53	GND	P51	GND	P49
GND	P56	GND	P54	GND	P52	GND	P50
GND	P63	GND	P61	GND	P59	GND	P57
GND	P64	GND	P62	GND	P60	GND	P58
GND	DY12	GND	GND	*A	GND	GND	*A
*A	GND	GND	*A	GND	GND	GND	GND



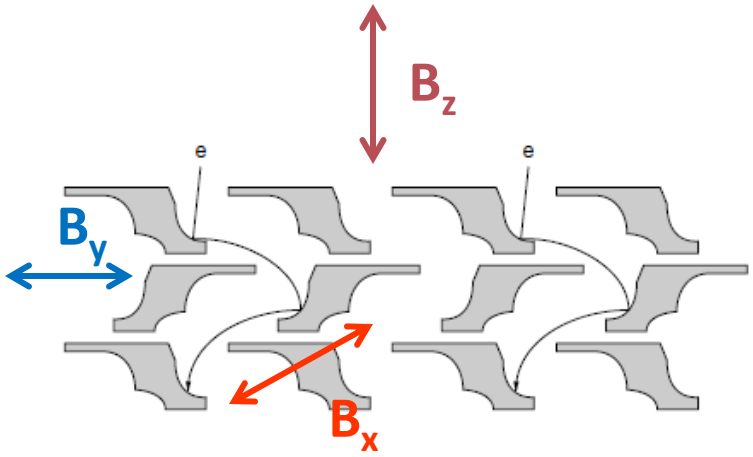
Quad division
or
Sum

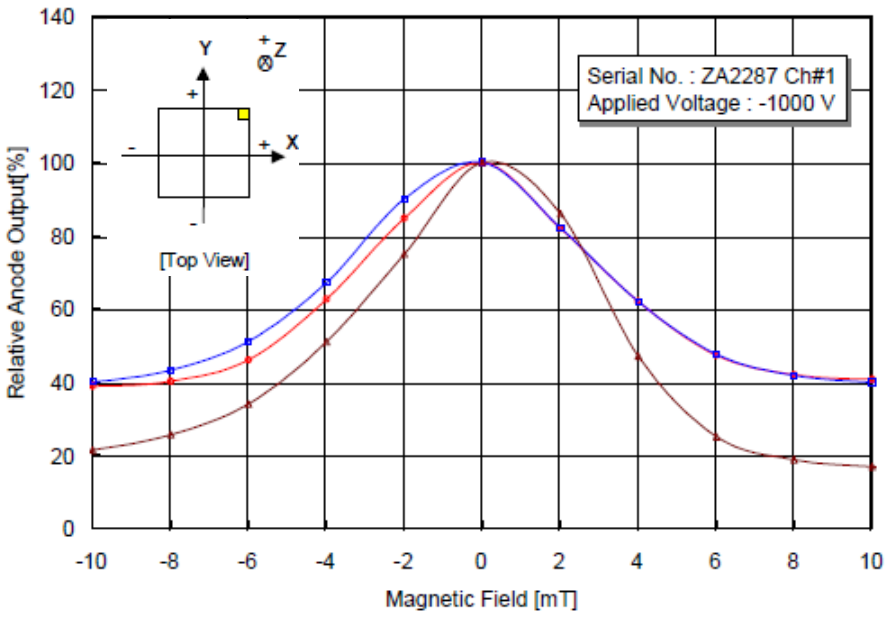
H8500C-03: Magnetic Field Response

→ Data from Hamamatsu (PMT unshielded)



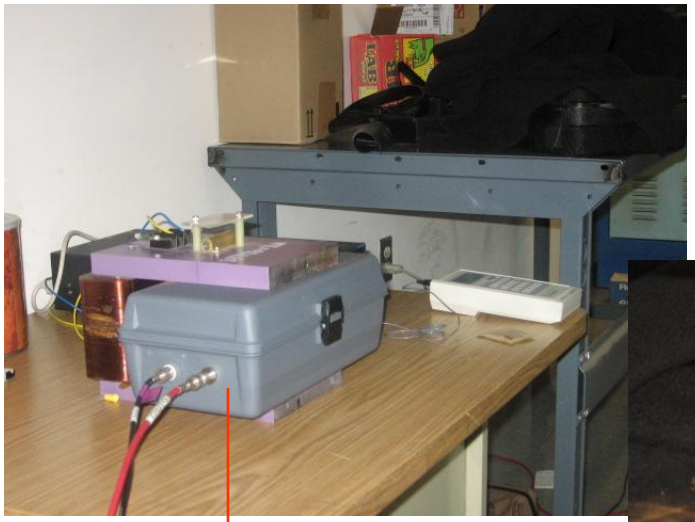
100 G





→ a 5” PMT would experience at 4 G same gain reduction as the maPMT at 100 G

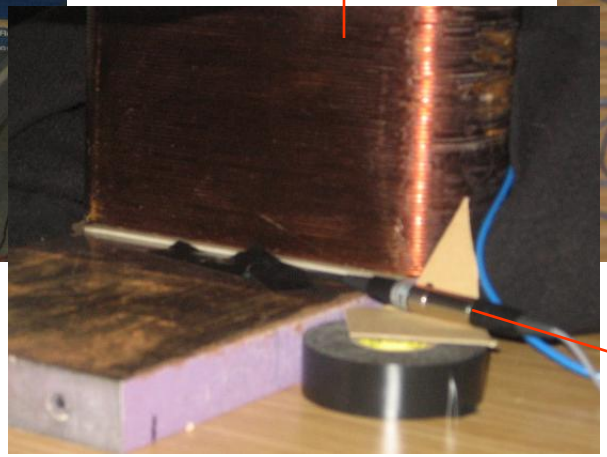
H8500C-03: Field Measurements at JLab

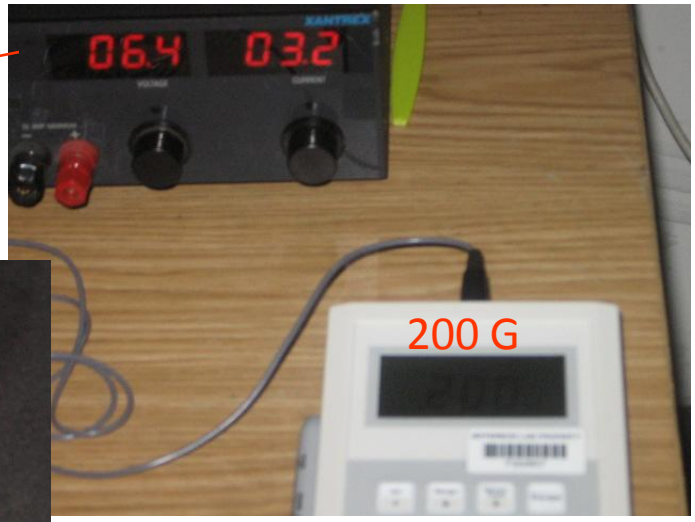


dark box inside the magnet

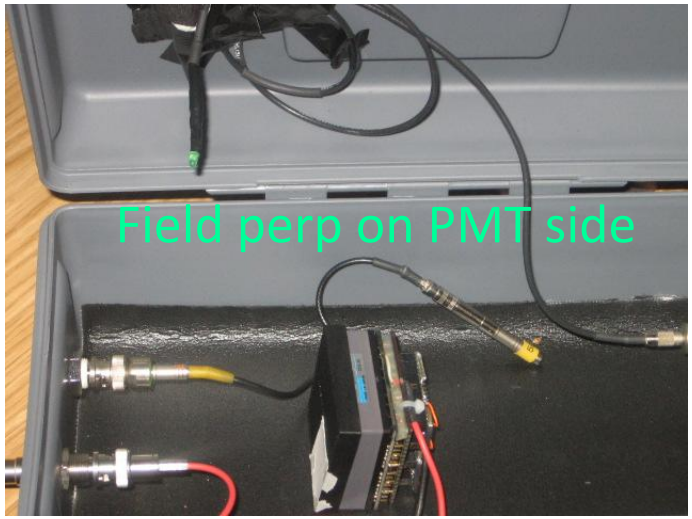
Power supply

Coil





Magnetic field probe in position for field measurement



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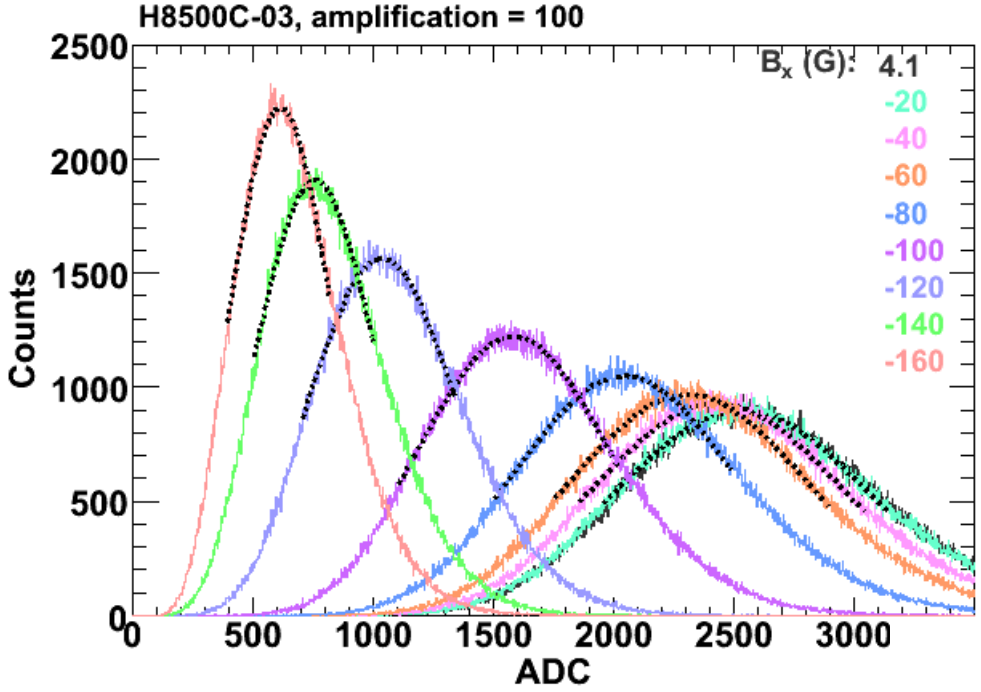
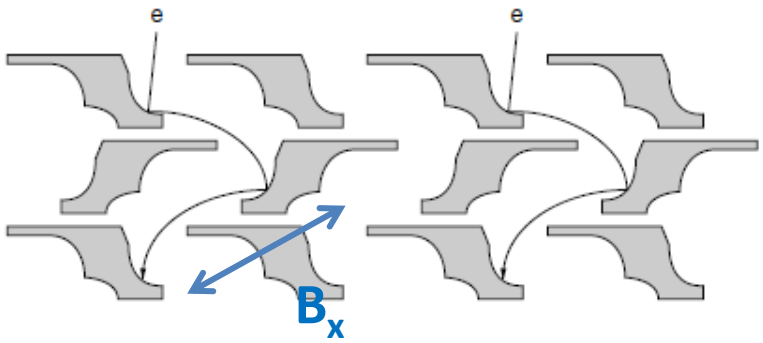
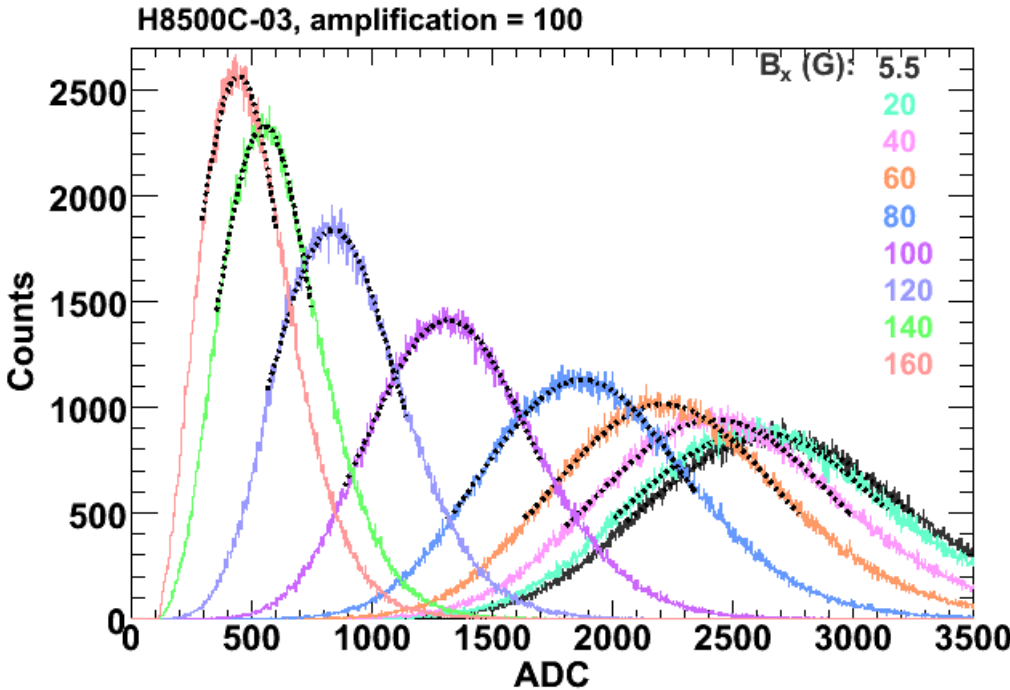




"Rapid" degradation of signal with field



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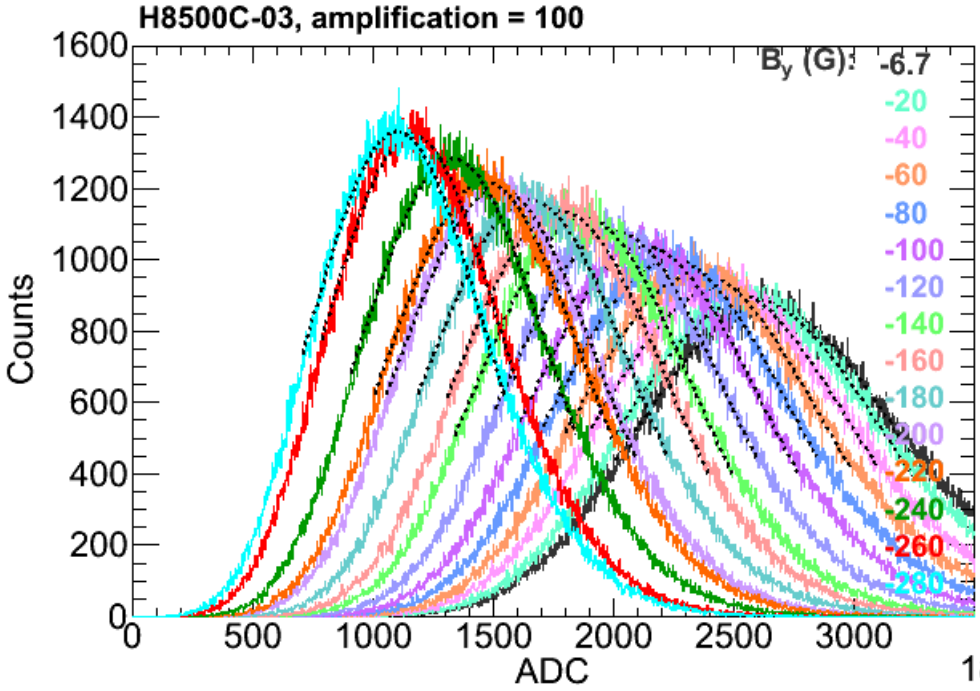
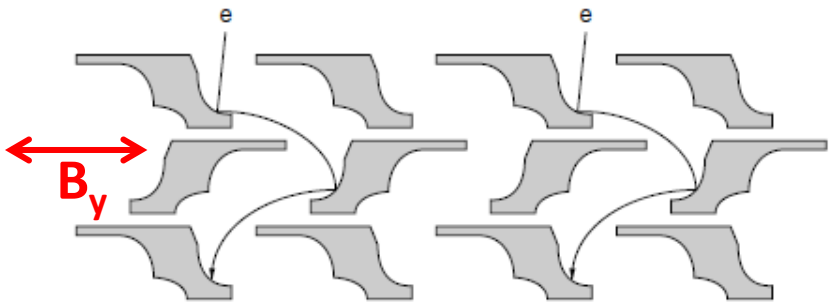
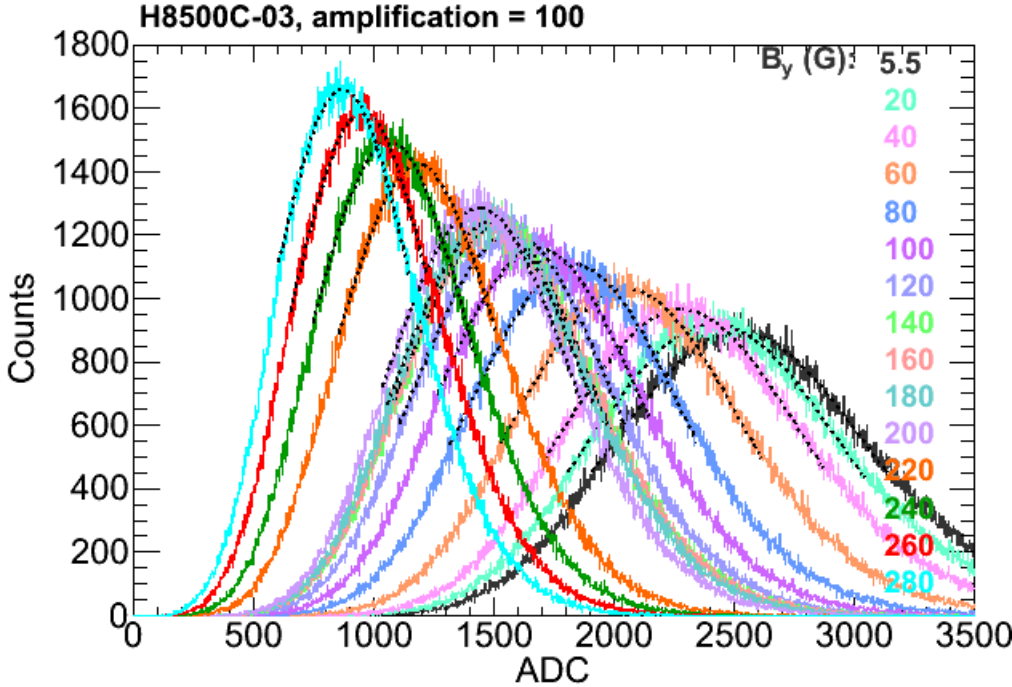




"Moderate" but continuous degradation of signal with field



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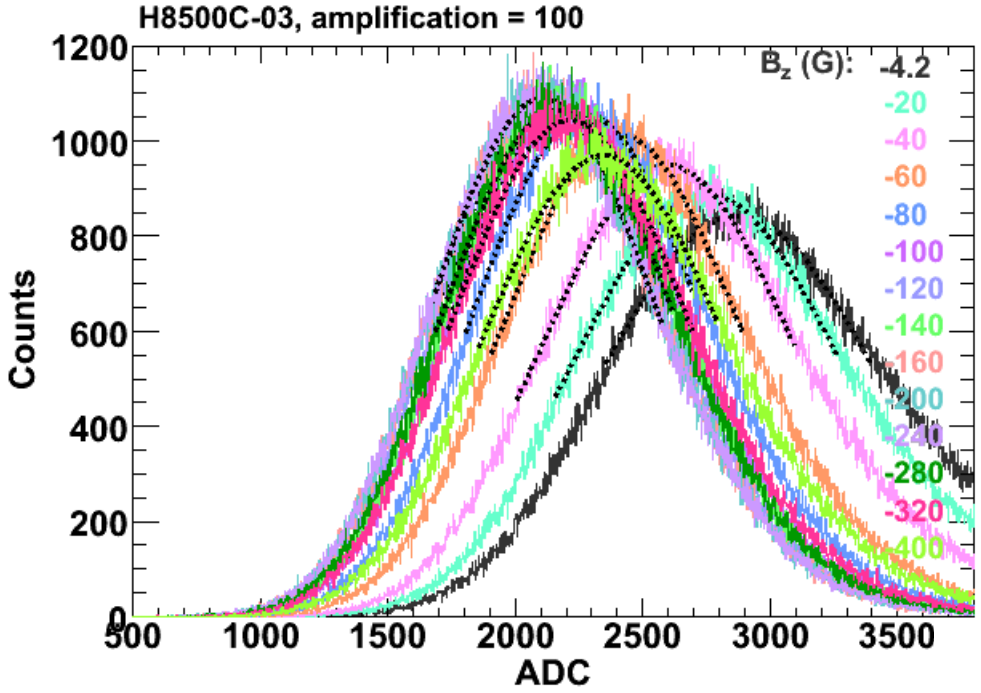
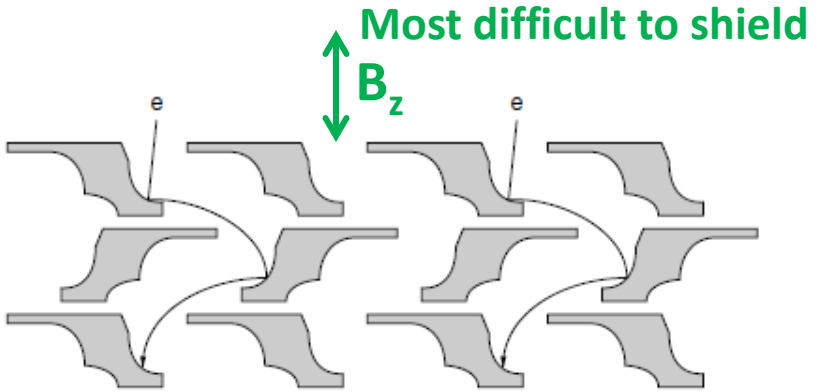
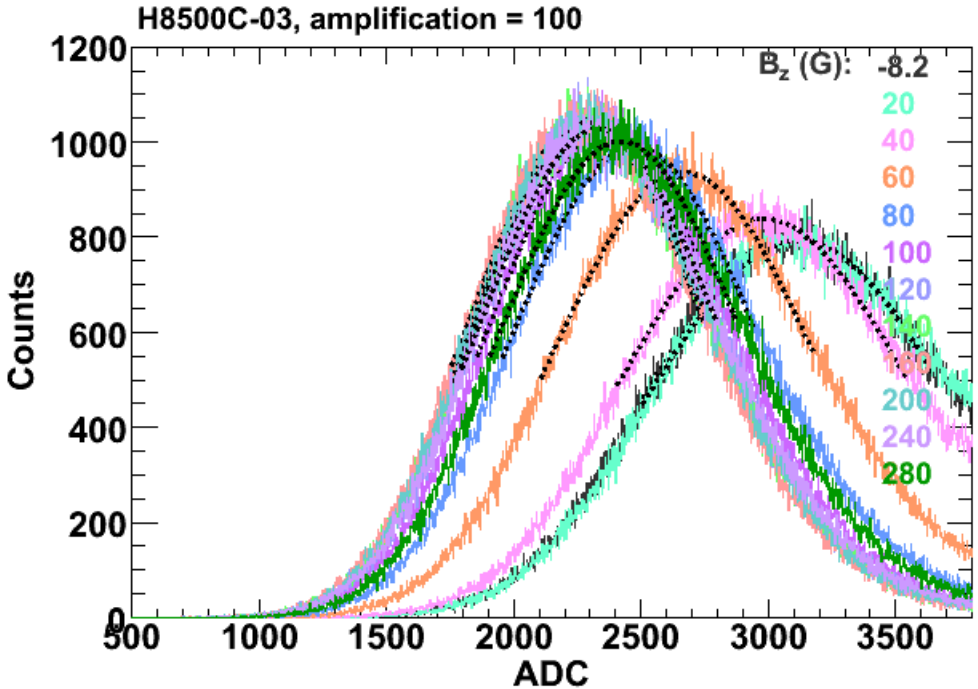




It saturates above 100 gauss!; will eventually die out at ~ 460 gauss – yeah, I went there)

It starts to recover above 280 gauss?!



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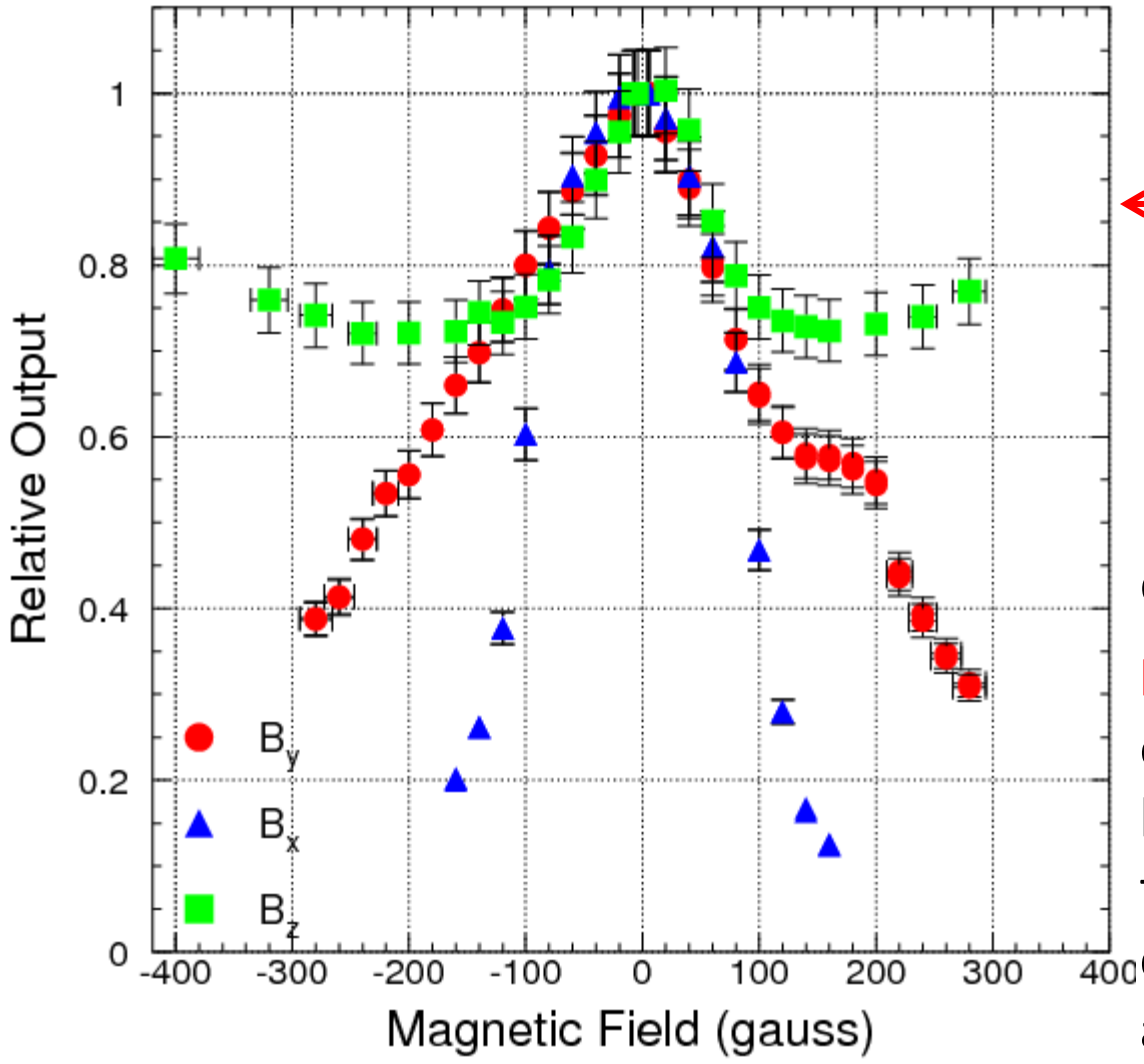
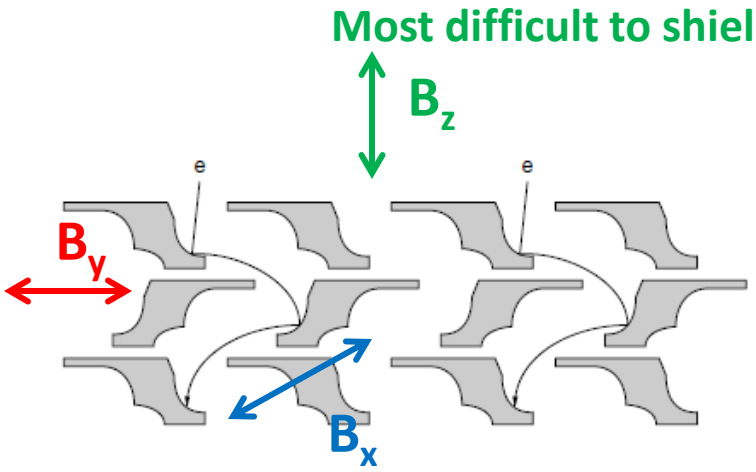


Just one quad; will do it on the sum too



Most interesting feature to me: saturation of relative output with B_z

If the decrease in relative output is due to loss of gain (i.e. loss of secondary electrons on the dynode chain) it could be corrected with amplification and little shielding would be necessary

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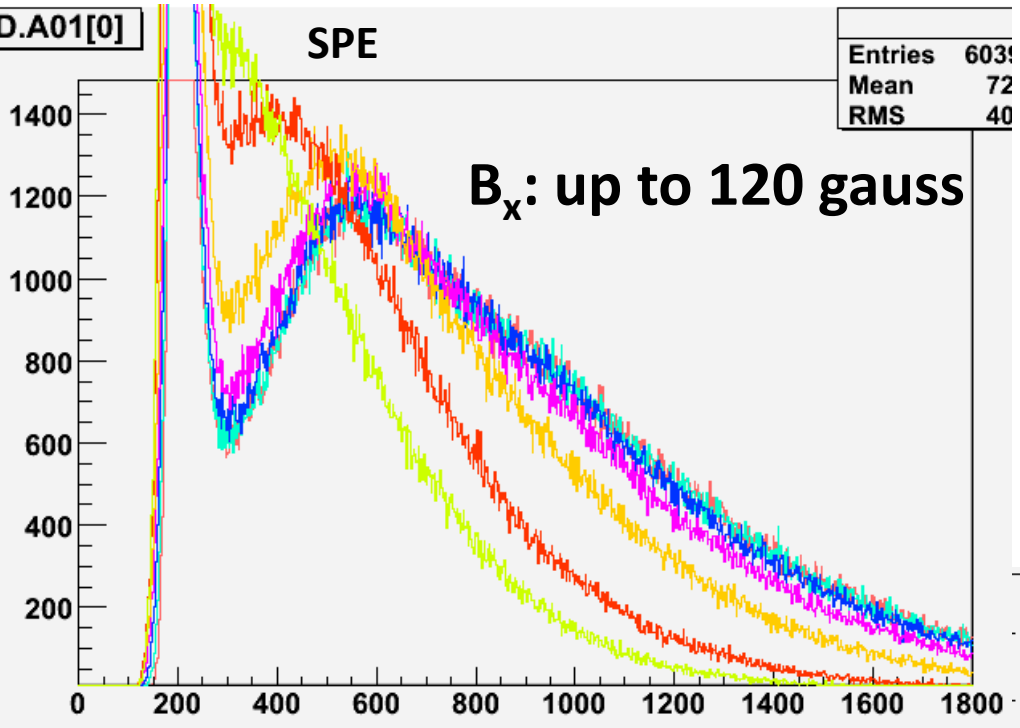

To answer that question: **field impact on the SPE signal**; working on a fit to de-convolute background/signal

But it appears that there's little impact on SPE from a B_z field (need quantitative answer)

Not the case with B_x

Preliminary