

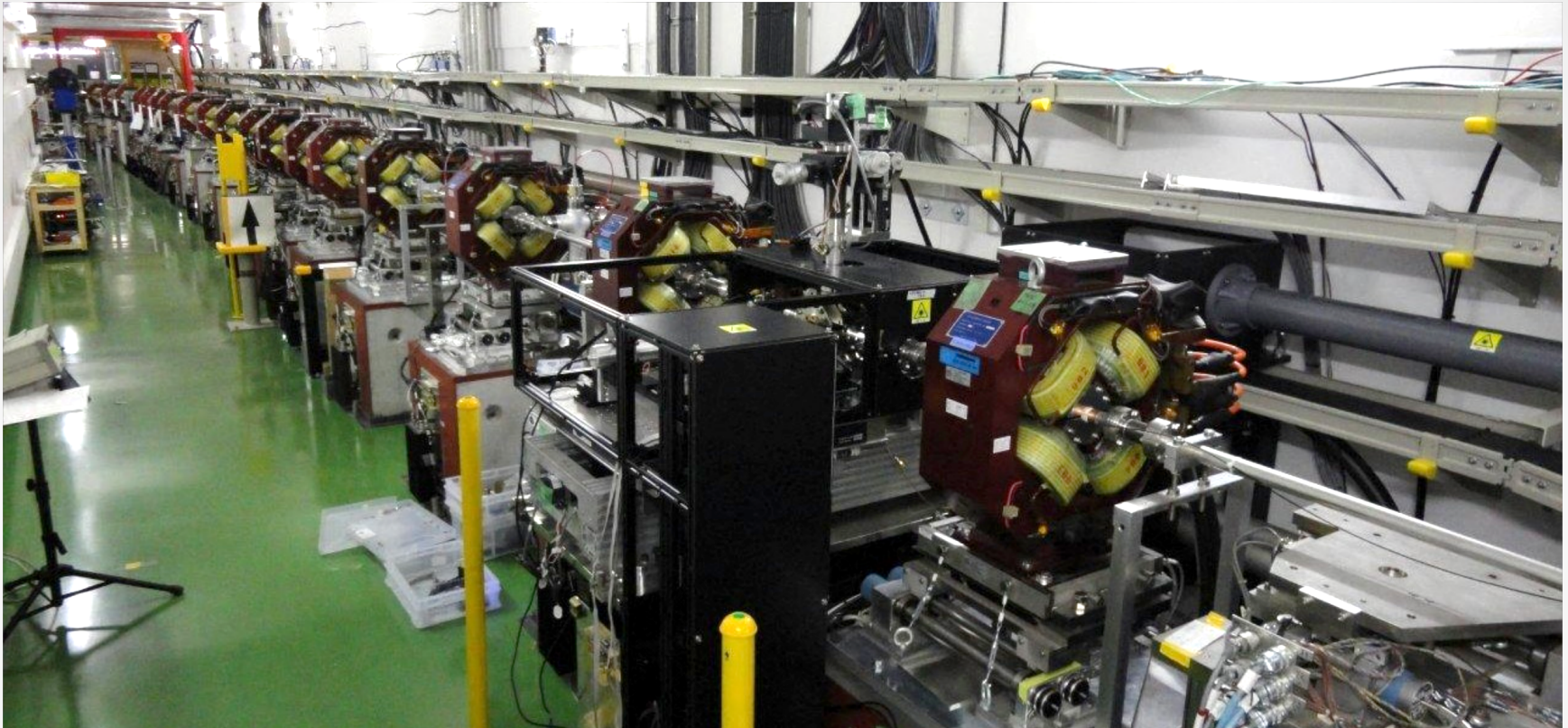
# Extraction Line Laser-wire

24<sup>th</sup> January 2013

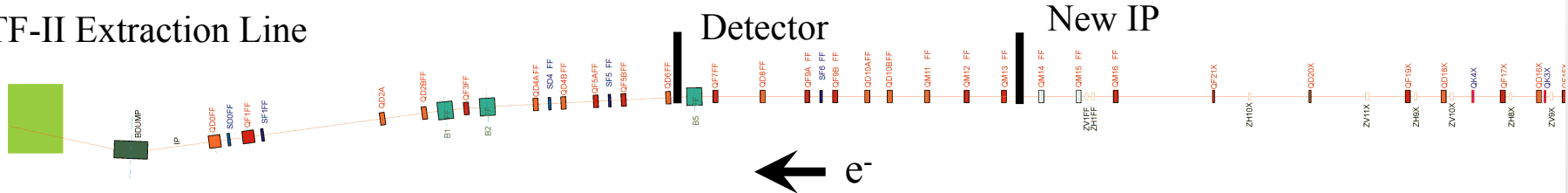
A.Aryshev, G.A.Blair, S.T.Boogert, L.Corner,  
L. Nevay, P.Karataev, N.Terunuma,  
J.Urakawa, R.Walczak



# Laser-wire Setup



ATF-II Extraction Line



# Operations

3 2012						
Su	Mo	Tu	We	Th	Fr	Sa
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

4 2012						
Su	Mo	Tu	We	Th	Fr	Sa
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30					

5 2012						
Su	Mo	Tu	We	Th	Fr	Sa
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

... Beam

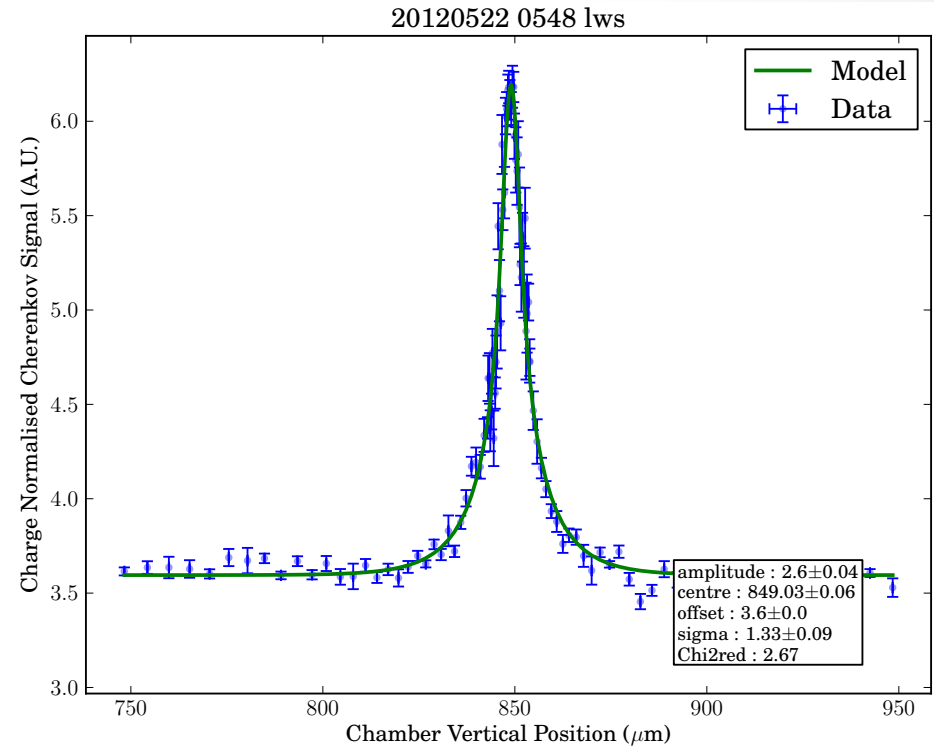
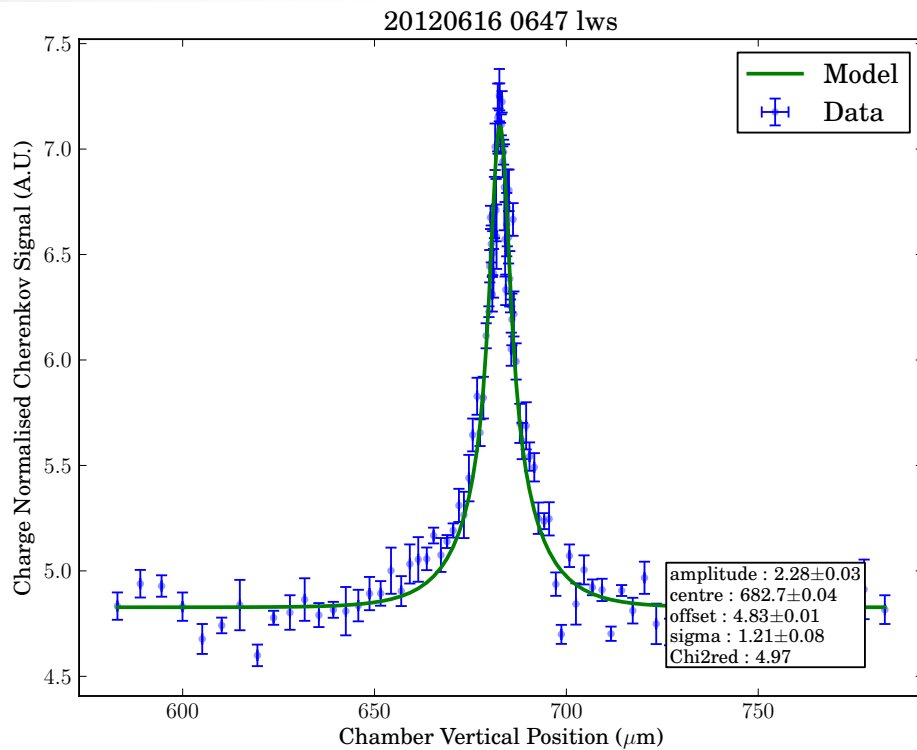
6 2012						
Su	Mo	Tu	We	Th	Fr	Sa
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

- Operations during March – June
- No operations during Autumn
- Goal of 1 micron laser-wire scan
- Full characterisation of laser-wire



# Results

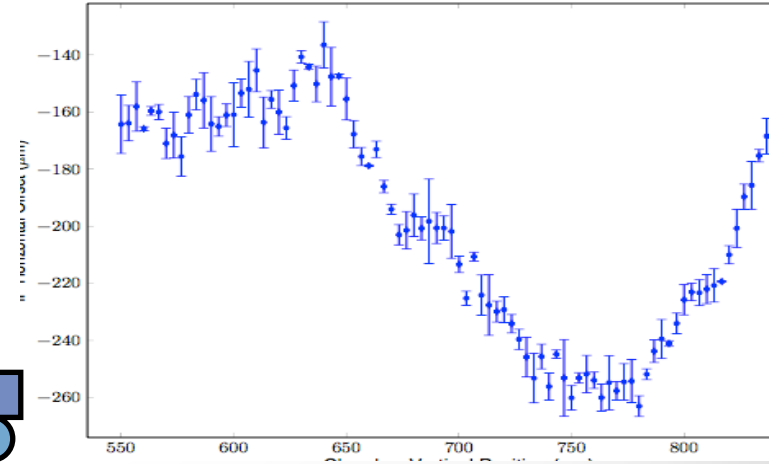
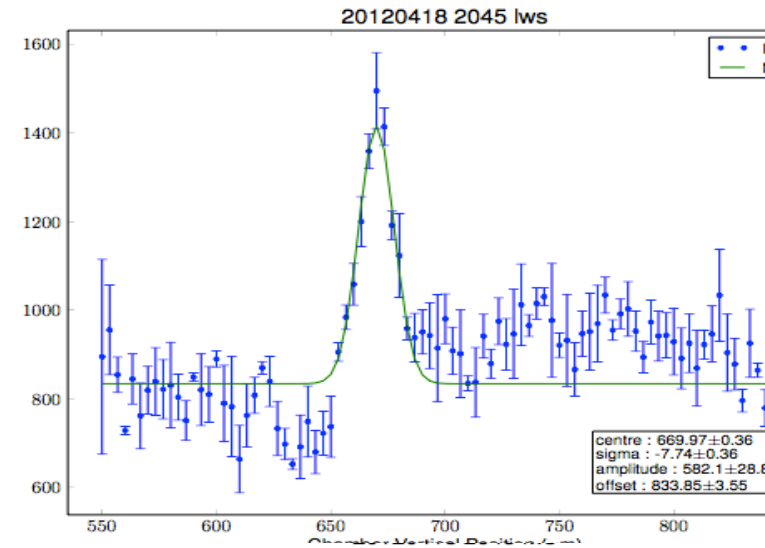
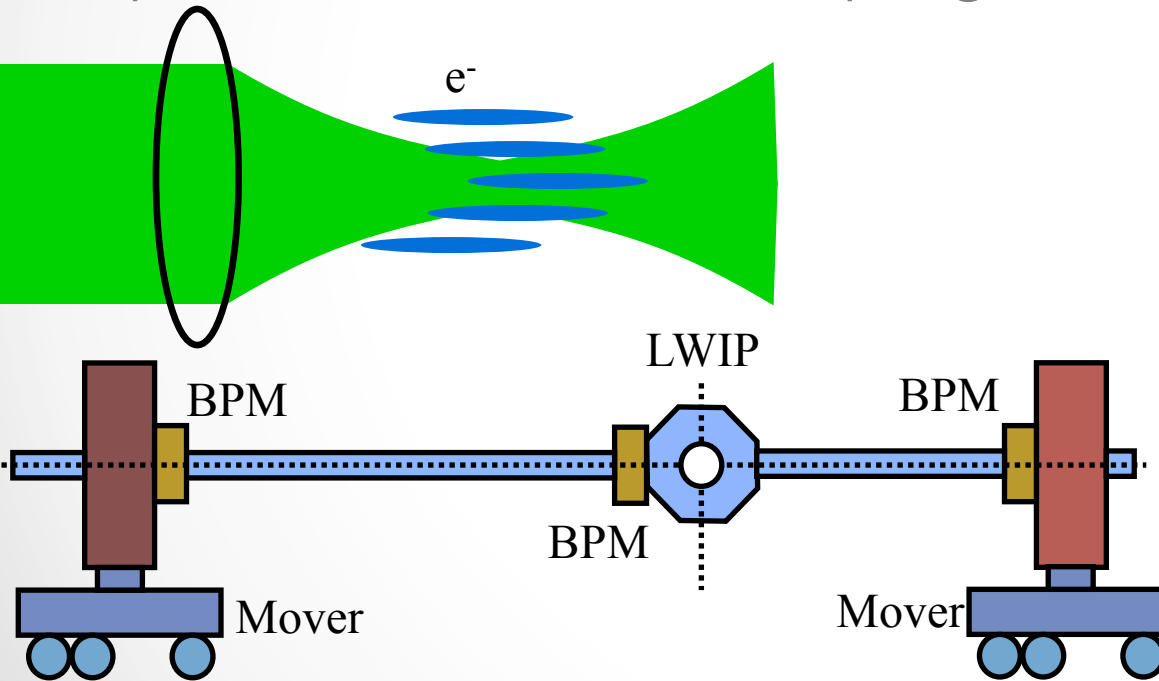
- Many scans between 0.9 and 1.5  $\mu\text{m}$
- Non-Gaussian shape as expected from laser





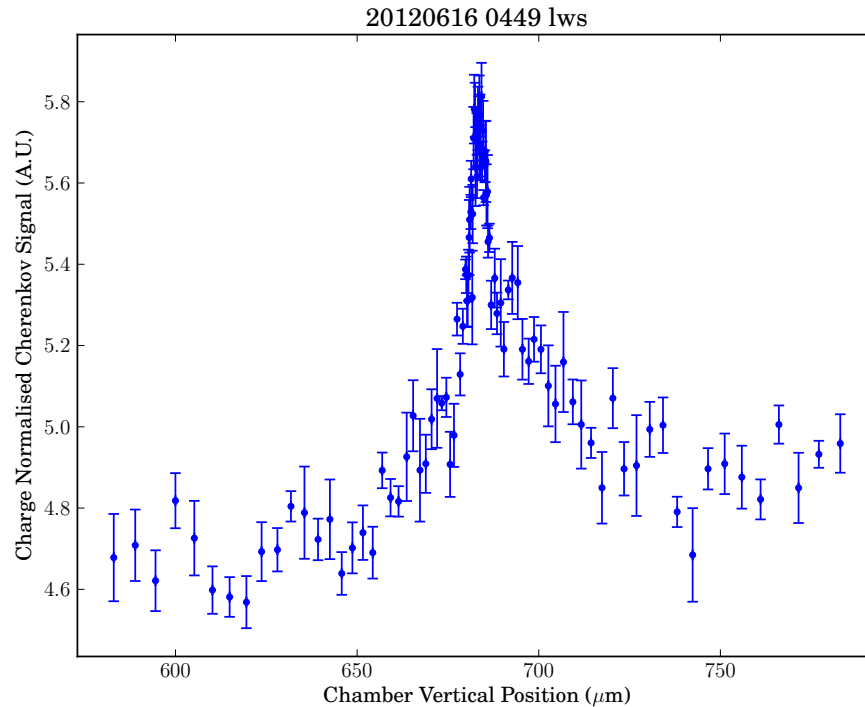
# Consistent Picture

- Not always so good
- Beam drift
  - much improved now due to linac feedback
- Bpm orbit subtraction in progress

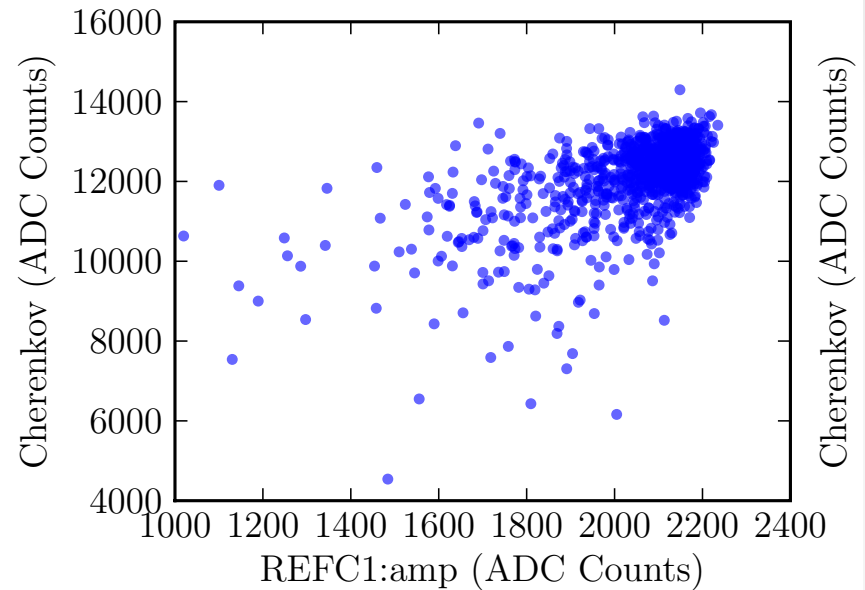
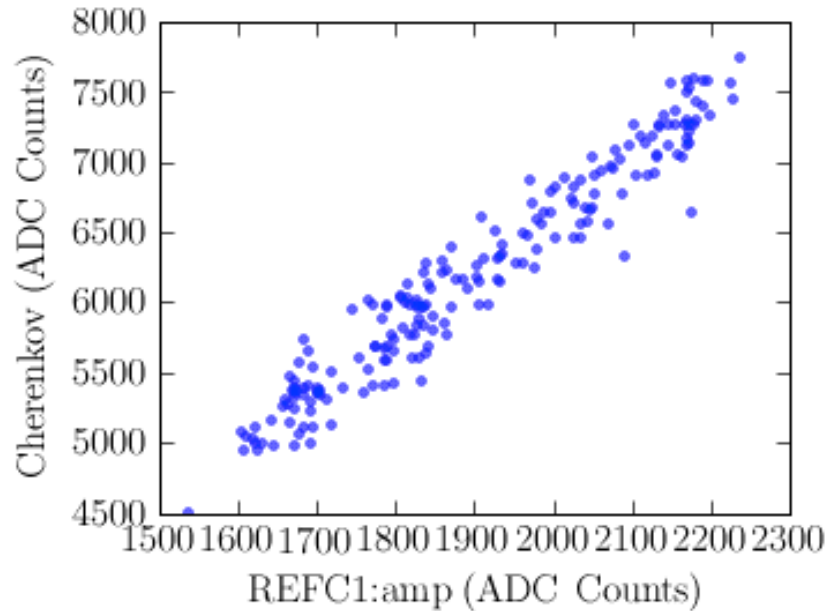


# Signal to Noise

- Background low under normal ATF2 operation
- Required squeeze in  $\beta$  at Laser-wire IP increases
- Laser old and can be unstable -> lower energy



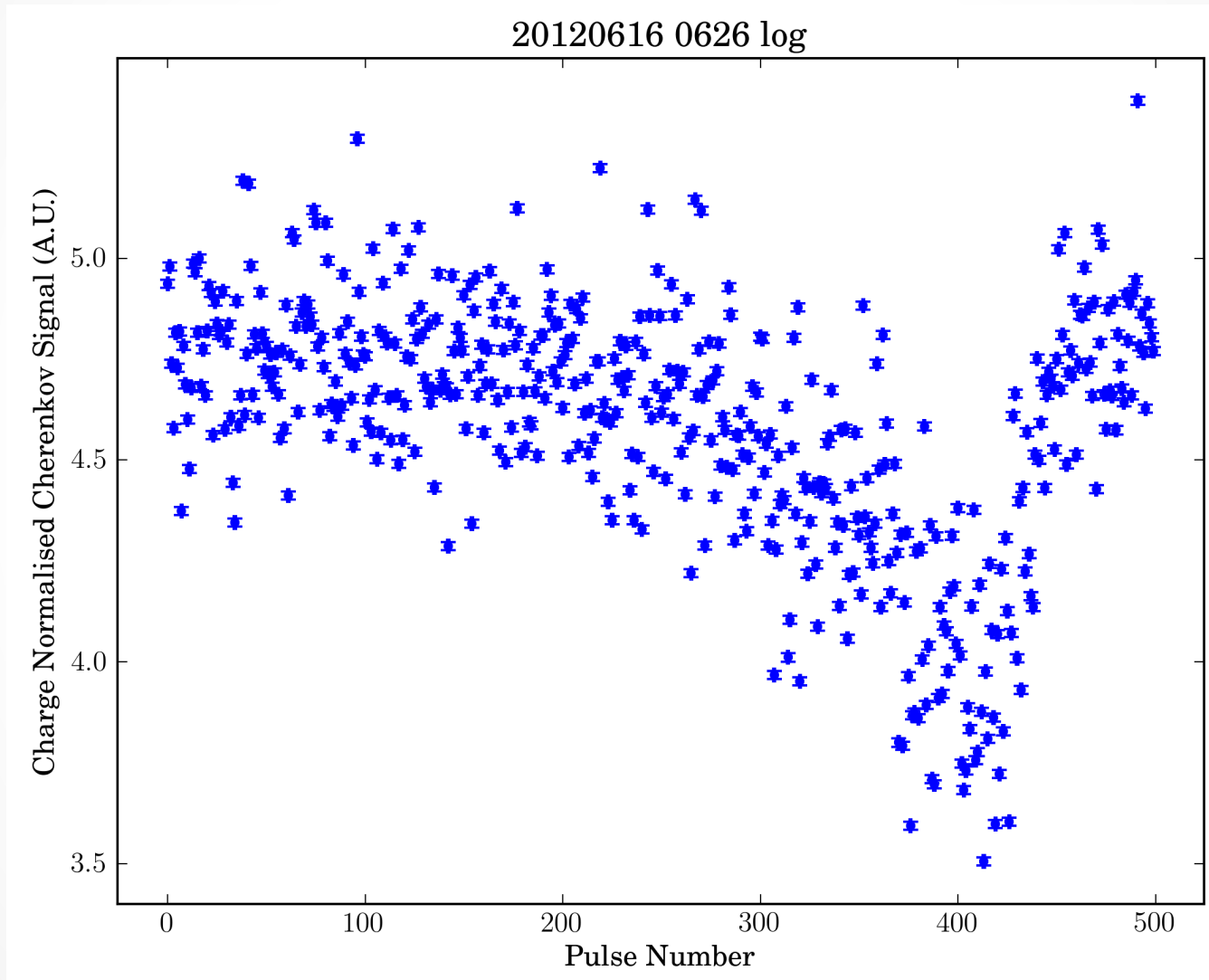
# Signal Correlations



- Background correlation varies from week to week
- Hardware improvements for laser normalisation



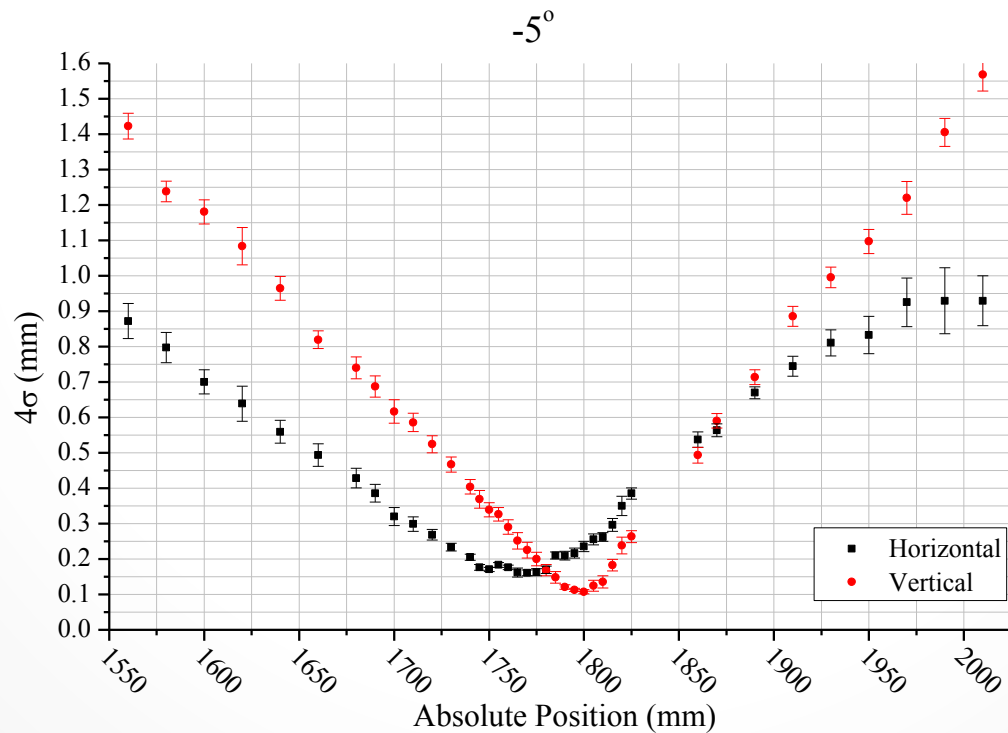
# Variation in Background





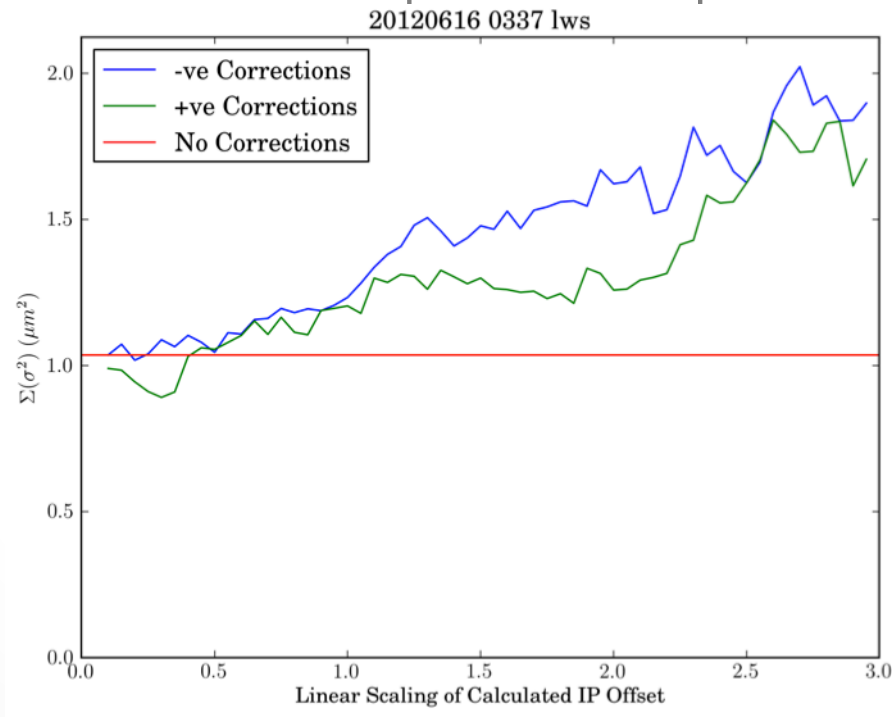
# Laser Characterisation

- Characterise using scaled up focus
- Scale this measurement to laser-wire IP
- Two axis – astigmatic – project vertical sigma



# Orbit Jitter Subtraction

- Orbit jitter subtraction currently doesn't improve
- Method being revised
- Correction is small compared to poor correlations



# Current Operations

- Recommissioning laser-wire since last year
- Investigation of signal correlations
- Investigation of orbit correction
  
- Improvements in signal characterisation
- Increased precision



# Future Operations

- Goal of 1 micron laser-wire scans a reality
- Consistent data needed for publication
- Operations confirmed until March
- Possible operations until Summer 2013
- Current incarnation will finish this summer
- New laser source required for further operations
- Resolution aspect of laser-wire study complete
- High repetition rate and intra-train scanning underway at DESY

