DAC scanning at Oxford

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DACs

- HVStripV1 has 13 global DACs

DAC number	Name	Default Value	Description
DAC0	VNCompNor	20	Normal comparator
DAC1	VNTW	20	Time walk compensated comparator – main current
DAC2	ThRes	10	Threshold tune resistance
DAC3	VNTWdown	20	Time walk compensated comparator – pulldown current
DAC4	BLRes	10	Resistance of the base line holder
DAC5	VNBiasRes	0	Bias resistance in the sensor diode
DAC6	VNFB	5	Feedback resistance
DAC7	VPLoadAmp	10	Load transistor current in the pixel amplifier
DAC8	VNTune1	0	Tune DAC 1 range for time walk compensation (0 if not used)
DAC9	VNSF	10	Source follower bias in the pixels
DAC10	VNTune2	0	Tune DAC 2 range for time walk compensation (0 if not used)
DAC11	VNTuneNor	0	Threshold tune DAC range (0 if not used)
DAC12	VNAmp	60	Main bias current of the pixel amplifier
DAC13	VPAB	10	Analog buffer bias and hit bus bias

DAC scans

- There seems to be some correlation between DACs and gain/noise.
- Documentation unclear ⇒ proceed with scans

Procedure

- Choose one DAC number
- Start from value 1 up to 61 at step of 5, with the other s at default
- Take an Iron55 source spectrum
- Two channels: (3,0) and (17,1) on MB01
- From the peak extract:
  - Gain ⟶ mean value (1640 electrons deposited)
  - Noise ⟶ peak sigma (divided by mean value to account for gain)

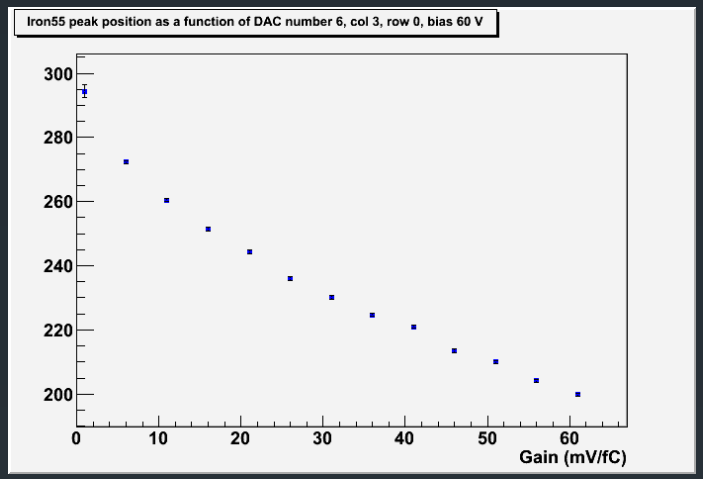
DAC 6

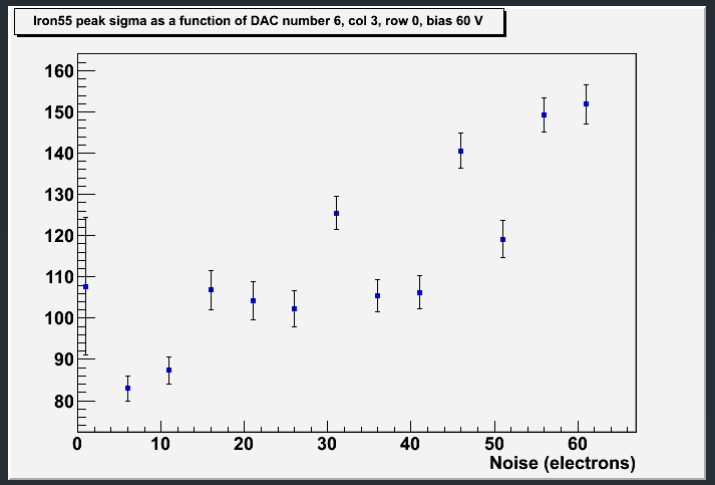
- Feedback resistance

Gain

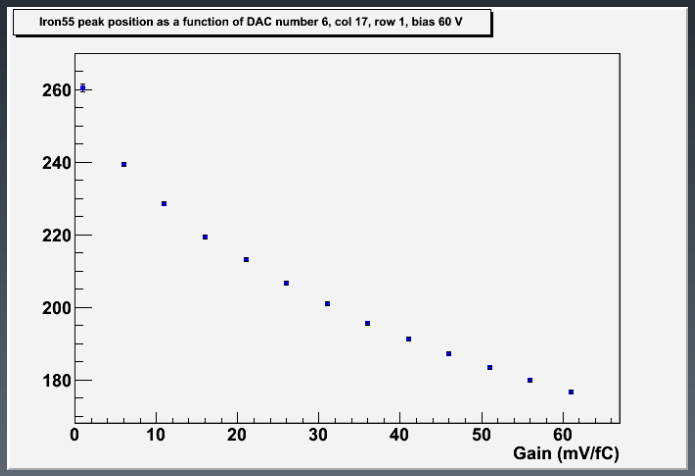
Noise

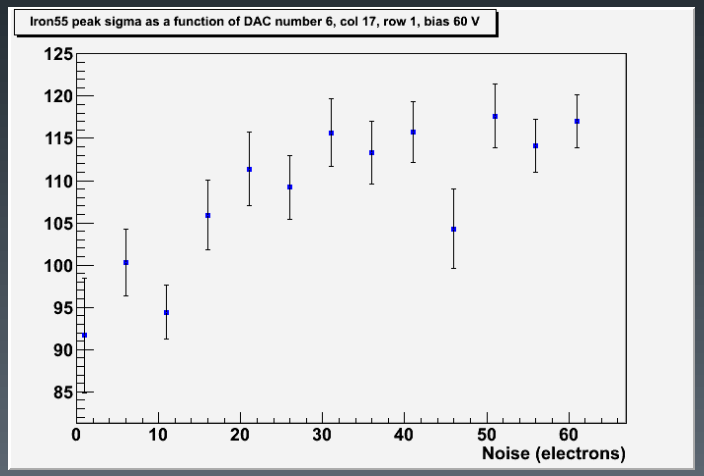
Channel (3,0)





Channel (17,1)





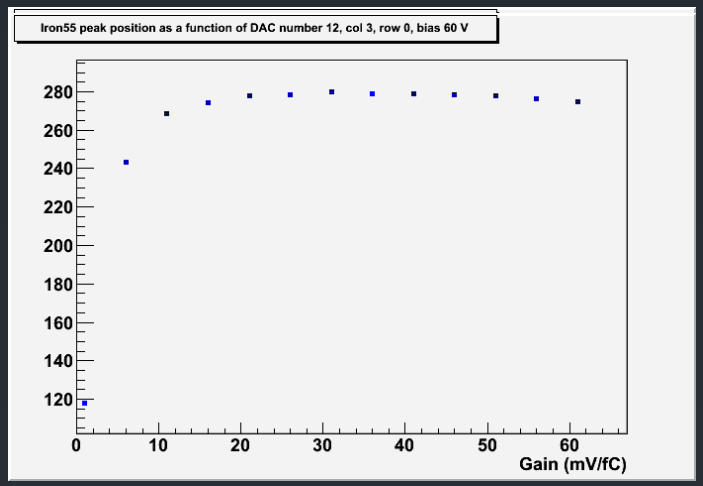
DAC 12

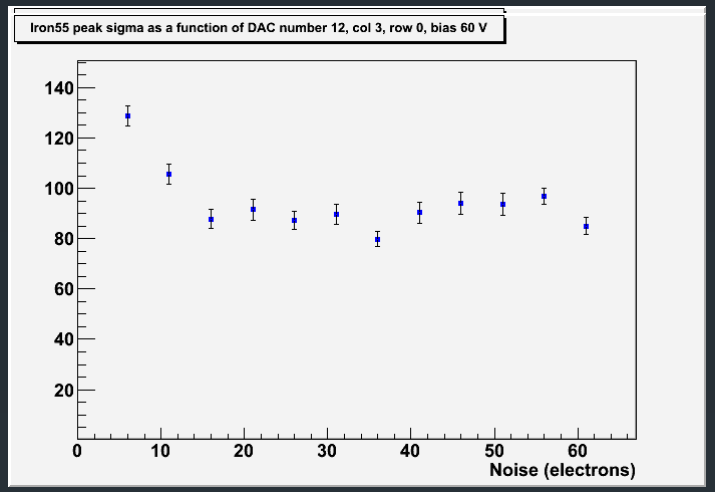
- Amplifier's main bias current

Gain

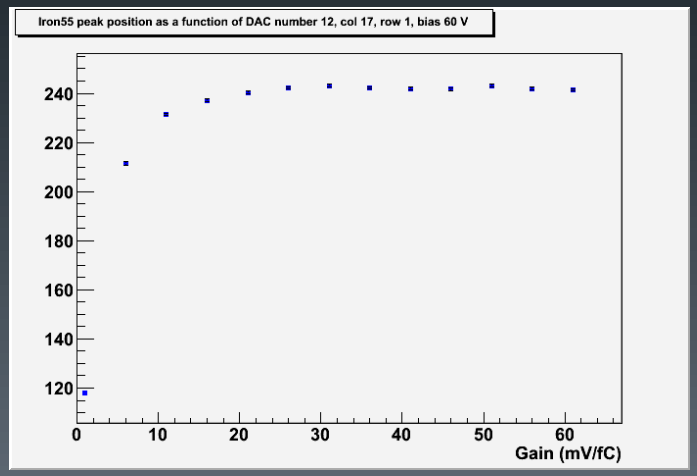
Noise

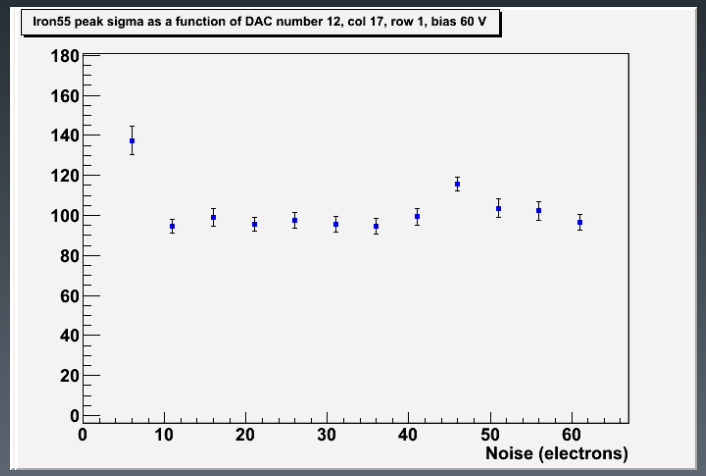
Channel (3,0)





Channel (17,1)





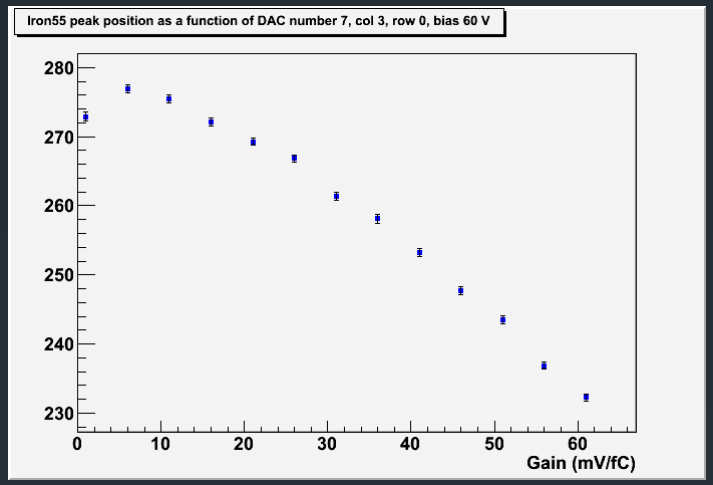
DAC 7

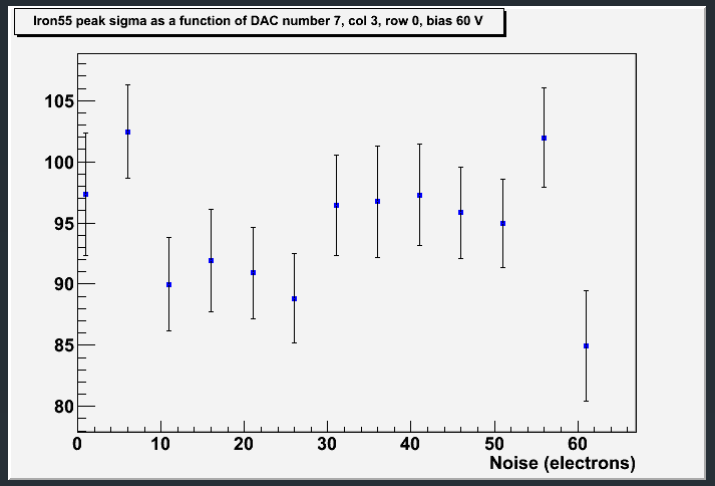
- Amplifier's load transistor current

Gain

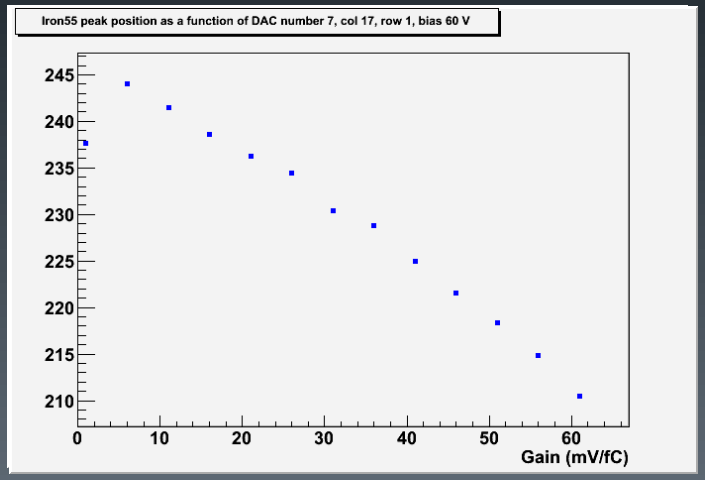
Noise

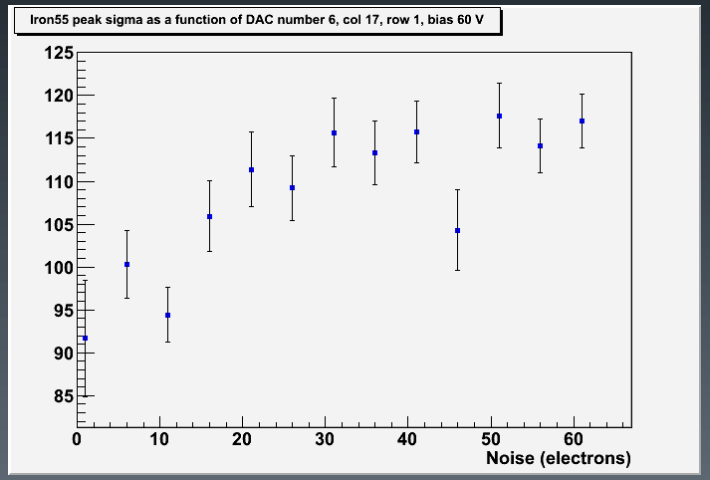
Channel (3,0)





Channel (17,1)





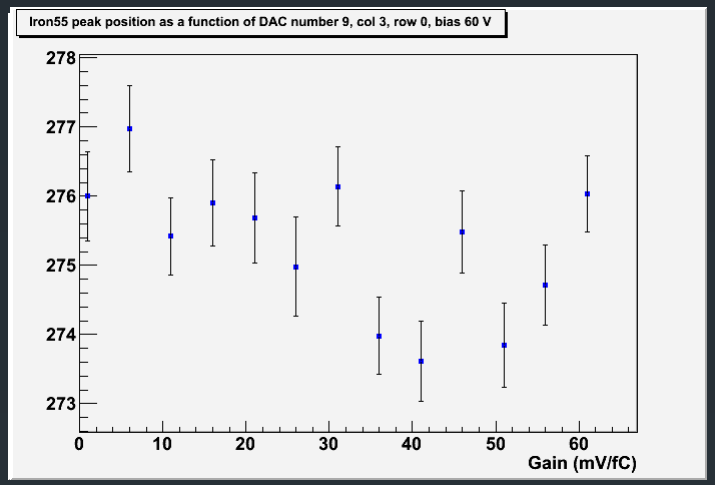
DAC 9

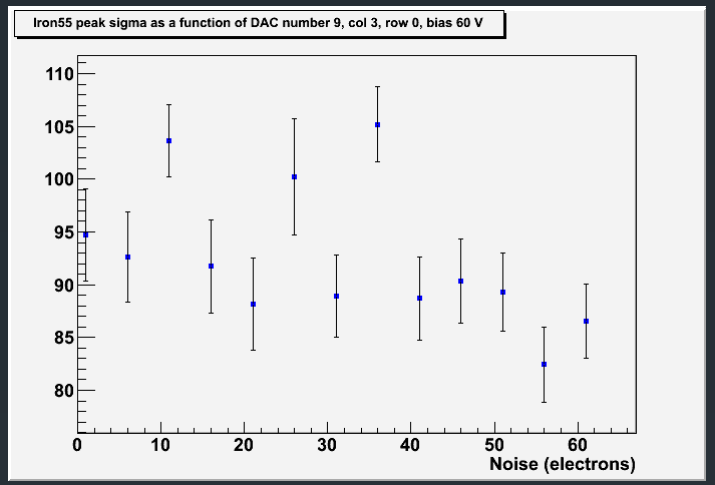
- Source follower bias

Gain

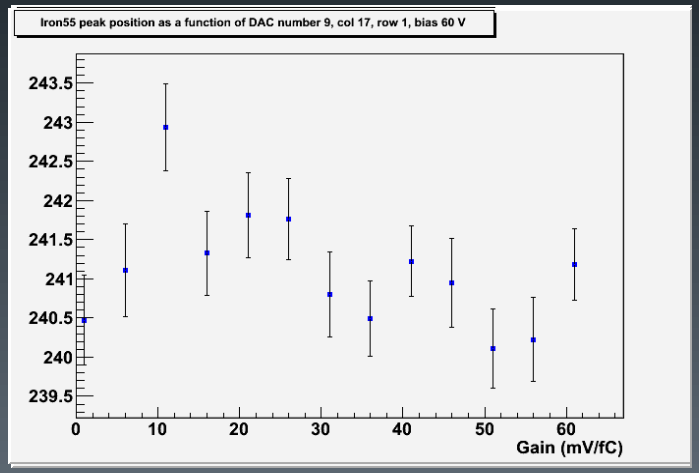
Noise

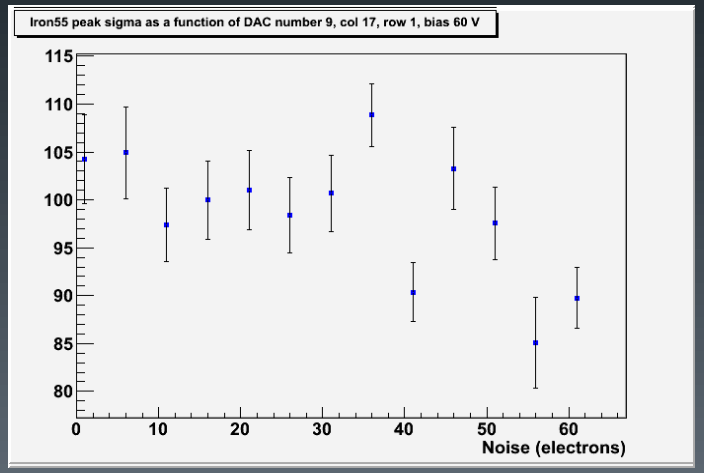
Channel (3,0)





Channel (17,1)



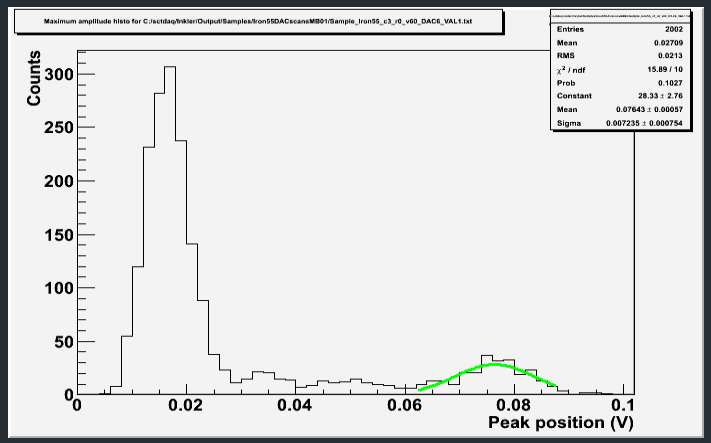


Next

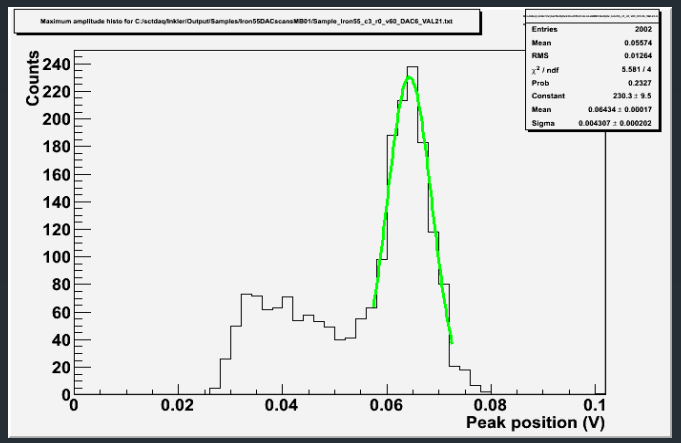
- Other scans to be performed on the other DACs
- Relative efficiency (work in progress)
- Verify that the default configuration is the optimal

Backup

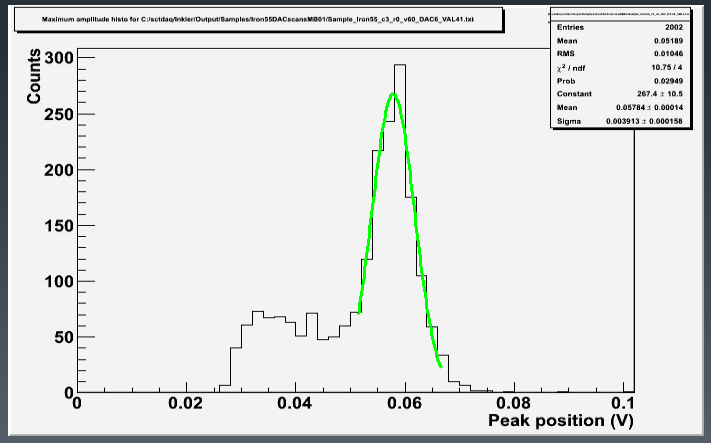
Some spectra: DAC6 scan on (3,0)



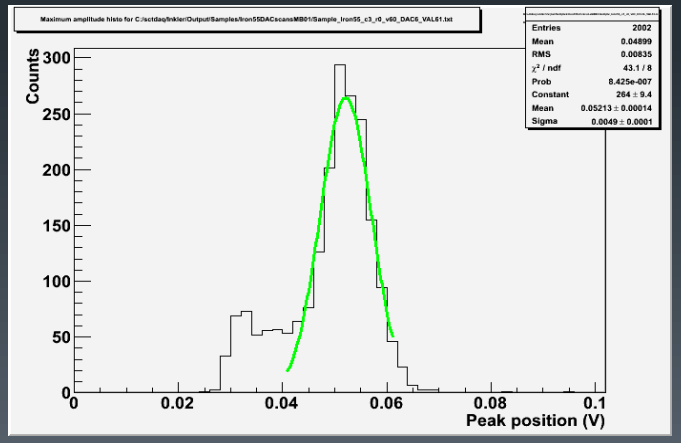
Value: 1



Value: 21



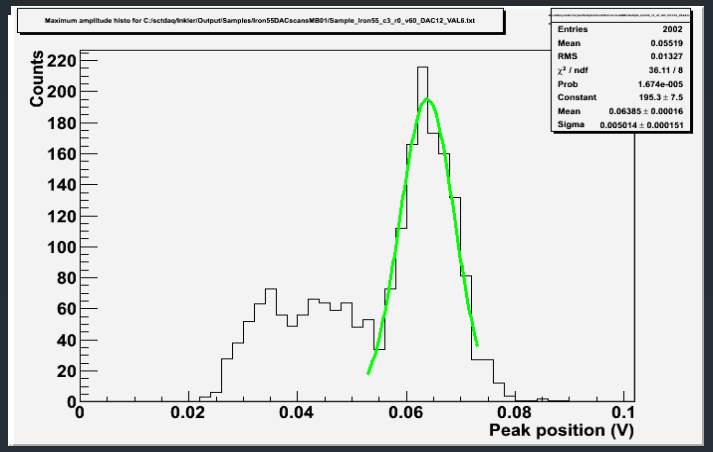
Value: 41



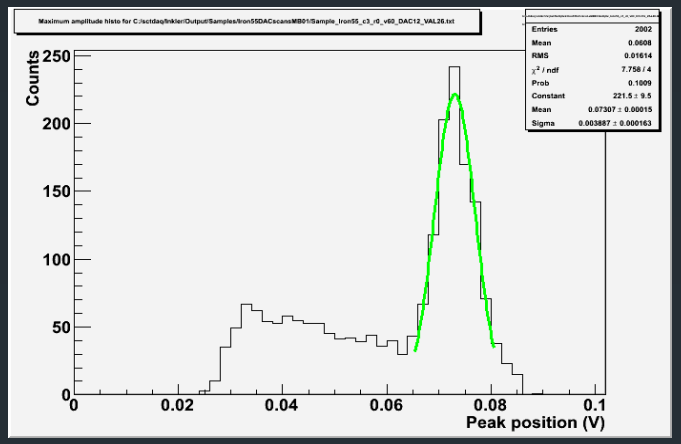
Value: 61

Backup

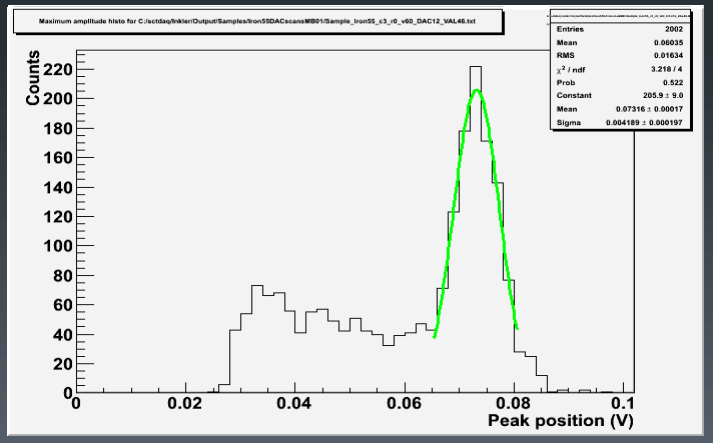
Some spectra: DAC12 scan on (3,0)



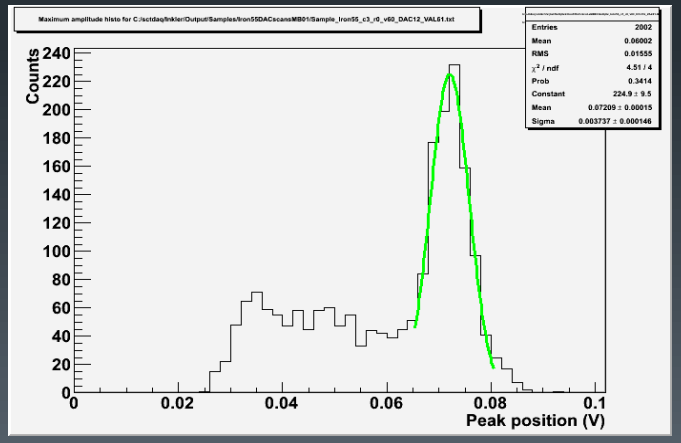
Value: 6



Value: 26



Value: 46



Value: 61