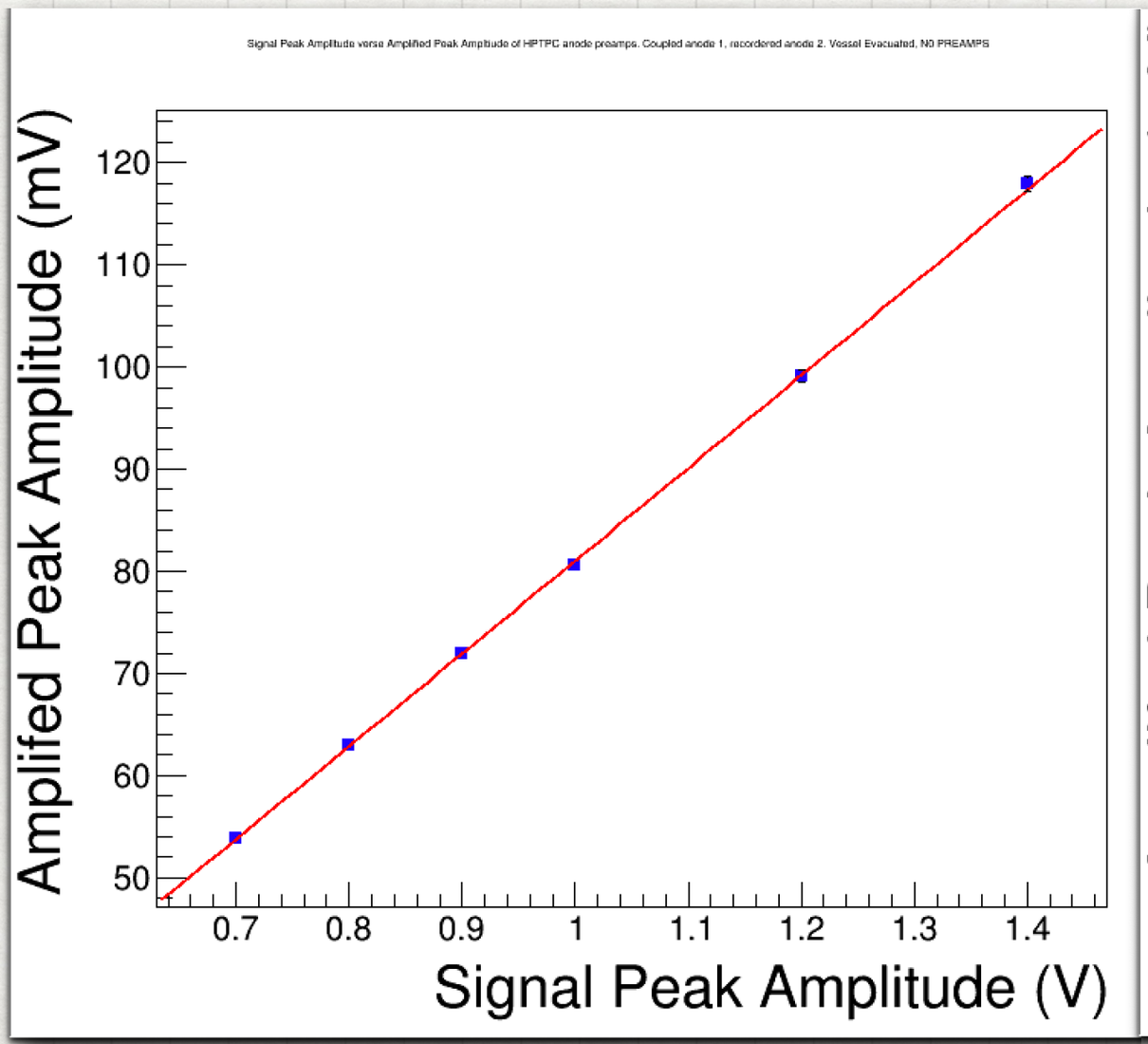
6/12/19 CAPACITANCE AND MISSING ELECTRONS

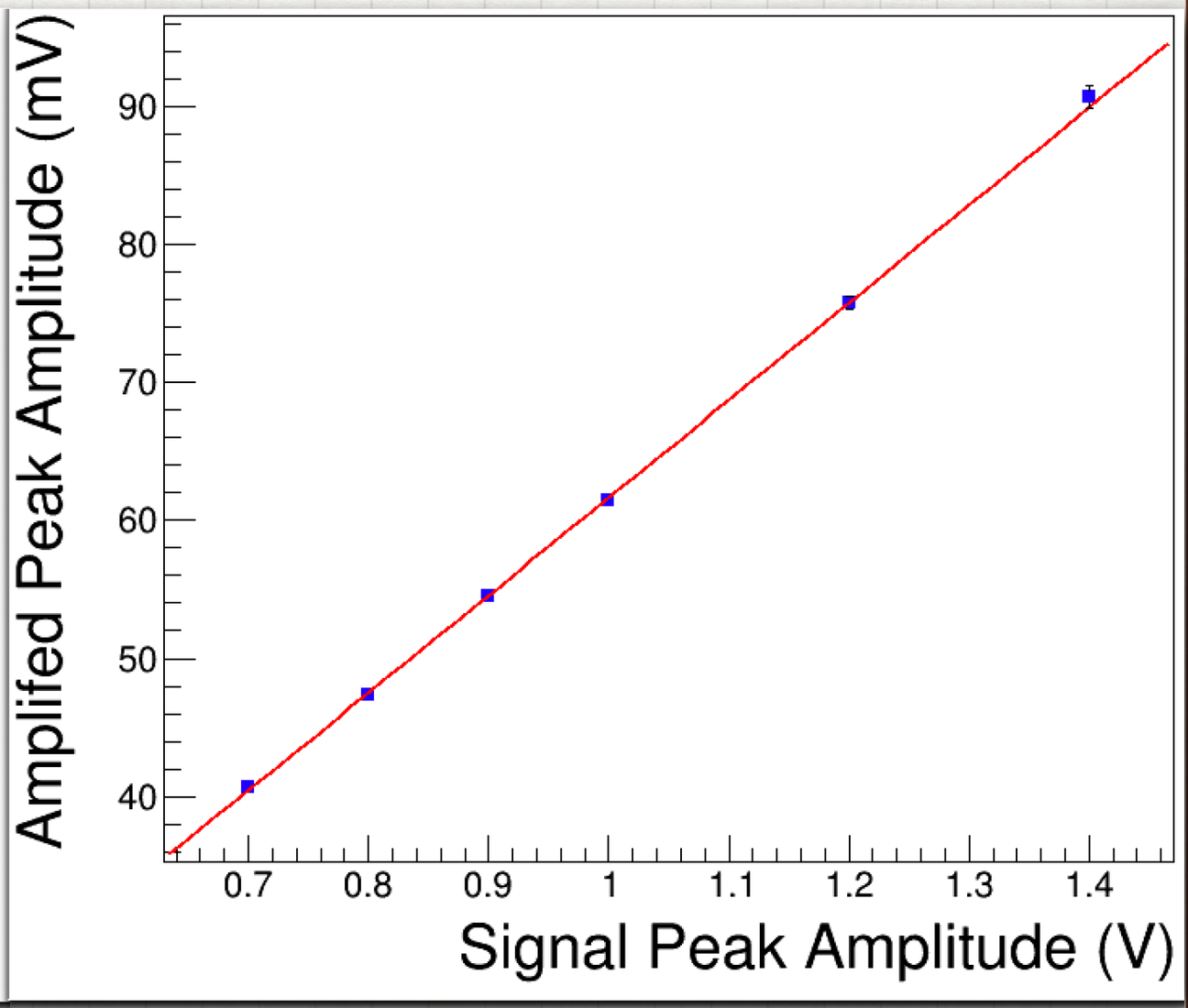
Adam Tarrant

HPTPC CALIBRATION EVACUATED

SIGNAL ON ANODE 1 WITH NO PREAMP



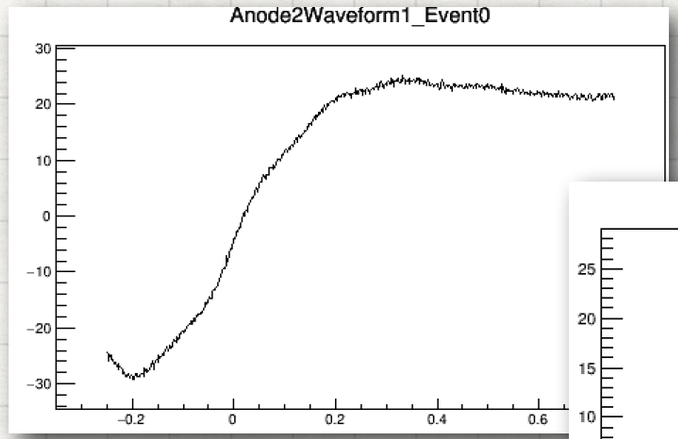
Gradient: 0.00908±0.00008

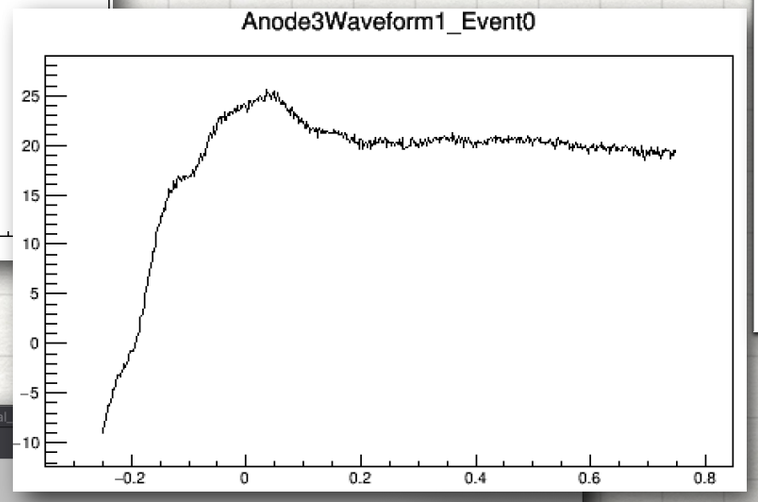


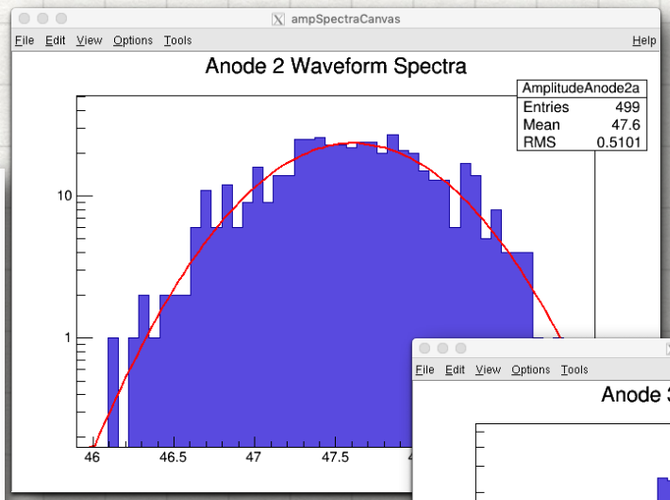
Gradient: 0.00706±0.00009

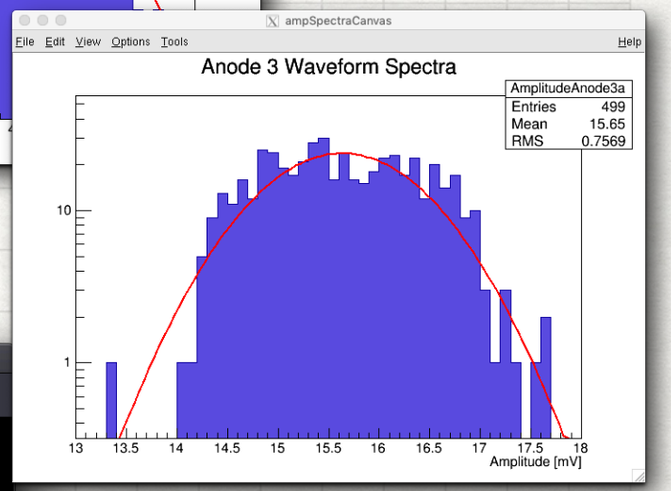
CAPACITANCE OF ANODES

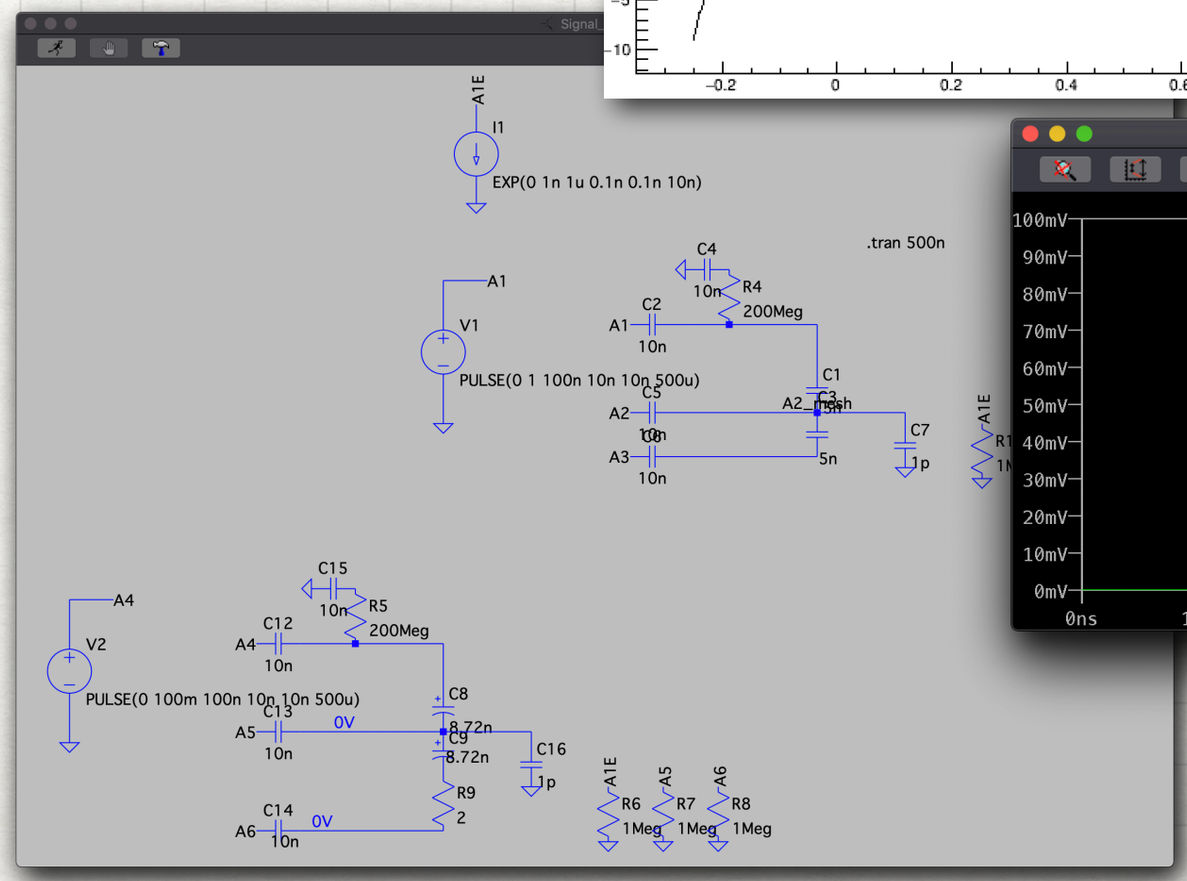
$$A = fG_{gas}G_{preamp}N_eQ_e$$











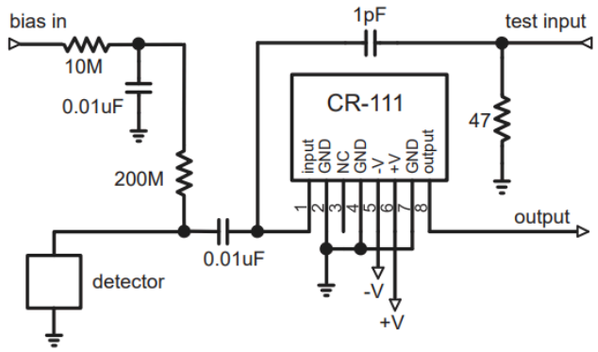
NEXT STEP

Need to retake data paying close attention to the triggering times to correctly raptorise the files to get the amplitude and hopefully this solves the problem of the missing electrons !

Also have started to do a numerical calculation based of the data sheets of the preamp

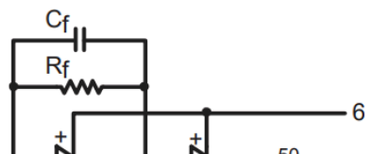
Typical setup

The CR-111-R2.1 is often AC-coupled to a detector in the way shown here. This circuit is available in the form of Cremat's CR-150-R5 evaluation board, providing a socket for the CR-111-R2.1 module, BNC connectors, and circuitry for powering the preamplifier. For more information see:
http://www.cremat.com/home/cr-150-r5-csp-evaluation-board/



Equivalent circuit diagram

This figure shows a simplified equivalent circuit diagram of the CR-111-R2.1, which is a two stage

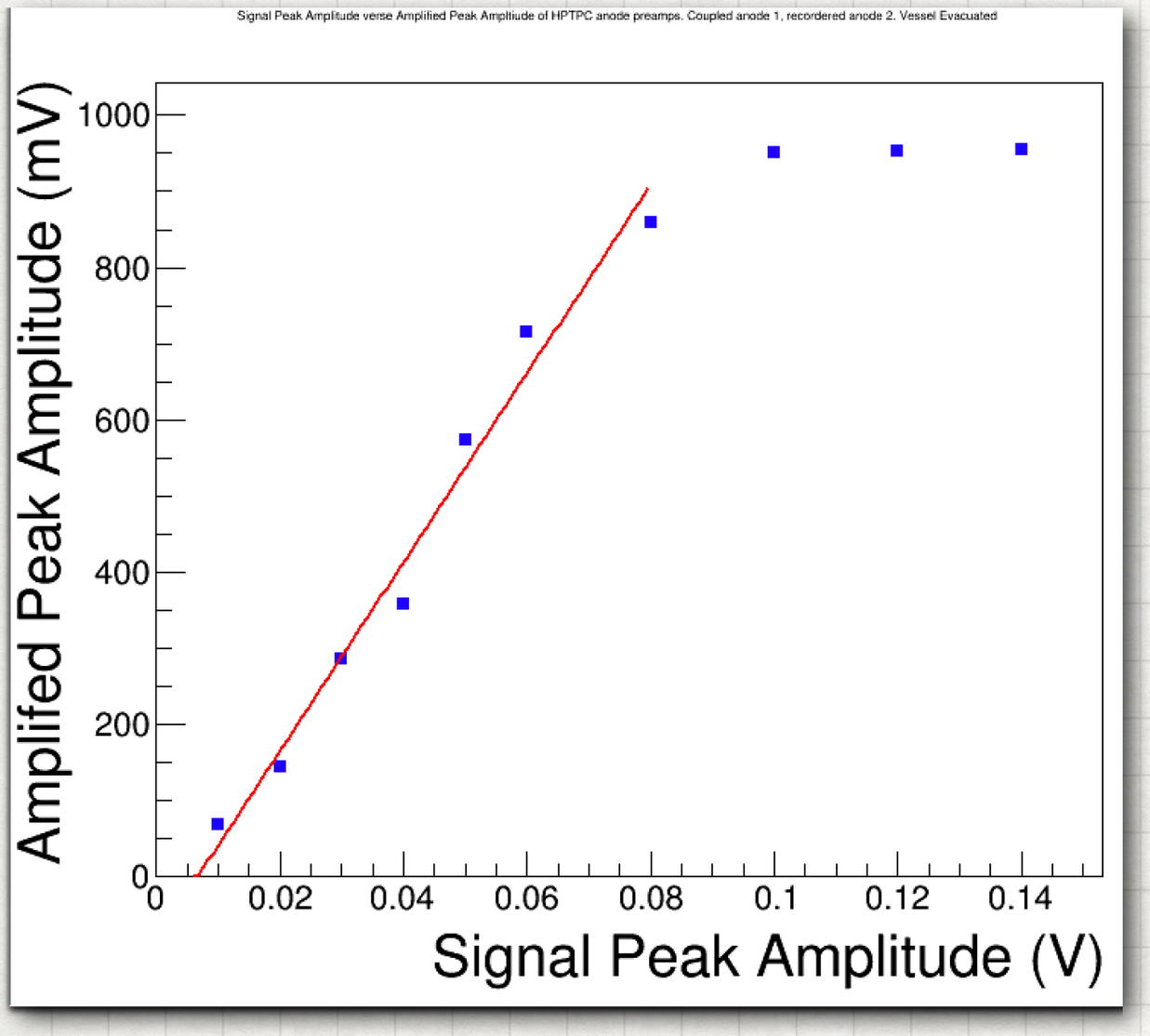


	CR-111-R2.1	units
Preamplification channels	1	
Equivalent noise charge (ENC)*		
ENC RMS	600	electrons
	0.1	femtoCoul.
Equivalent noise in silicon	5	keV (FWHM)
Equivalent noise in CdZnTe	7	keV (FWHM)
ENC slope	3.8	elect. RMS /pF
Gain	0.13	volts /pC
Rise time **	2	ns
Decay time constant	150	µs
Unsaturated output swing	-3 to +3	volts
Maximum charge detectable per event	1.3×10^8	electrons

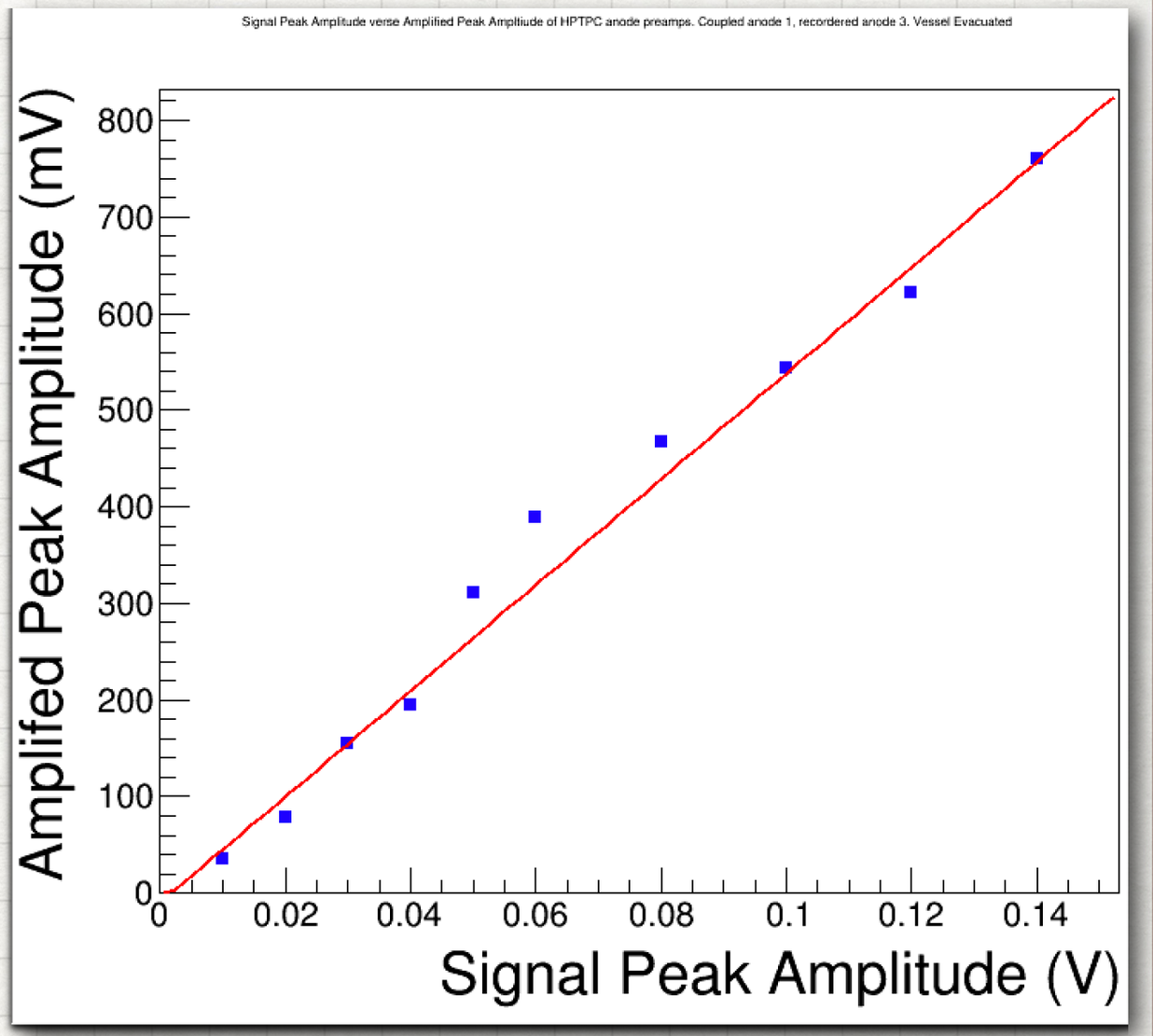
Backup Slides

HPTPC CALIBRATION EVACUATED

SIGNAL ON ANODE 1



Gradient: 12.406±0.002



Gradient: 5.480±0.01

HPTPC CALIBRATION

Signal on anode 1 In	Argon Co2 Mix	Evacuated	Evacuated No Preamp
Gain at Anode 2	13.2696±0.0009	12.406±0.002	0.00908±0.00008
Gain at Anode 3	10.4476±0.0004	5.480±0.01	0.00706±0.00009