

Serial test of Basel LNP preamplifiers

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University of Basel

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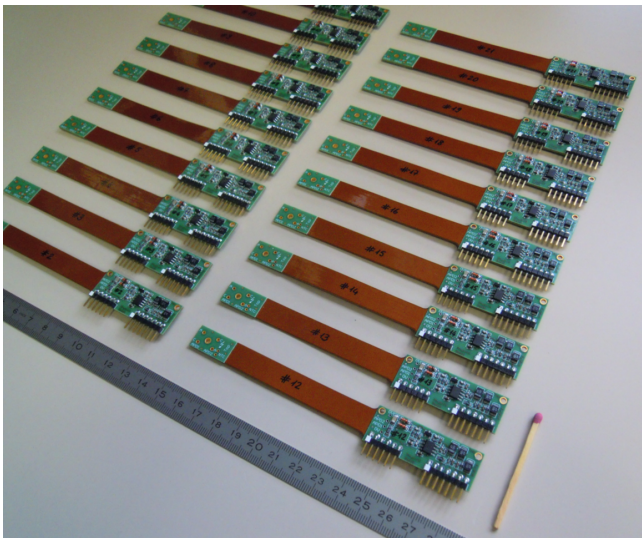
1 Motivation

2 Test setup

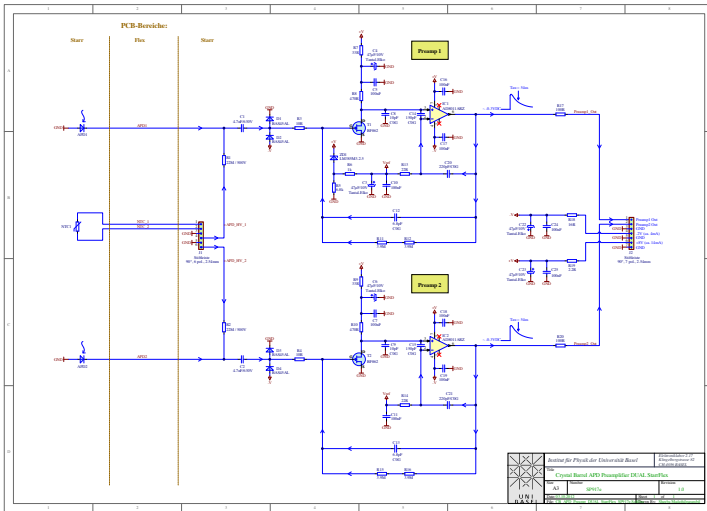
3 Results

4 Summary

Basel LNP PreAmp's for Crystal Barrel upgrade



LNP for Crystal Barrel upgrade (APD)



Motivation

- No access to PANDA EMC modules
- Best pieces - minimal calibration - PHYSICS

Motivation

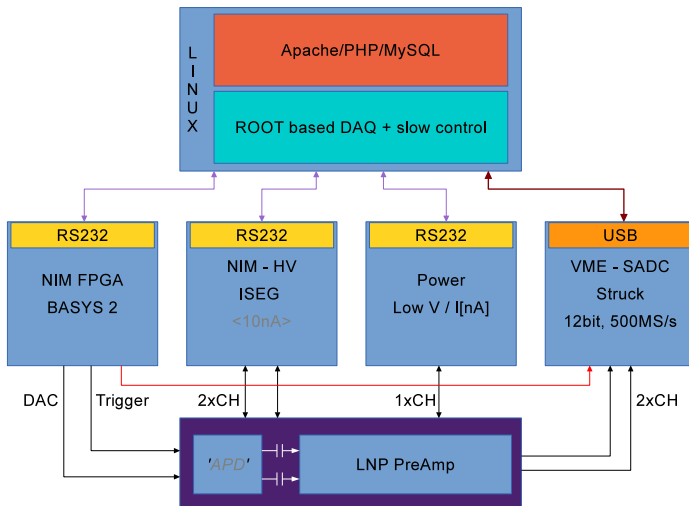
- No access to PANDA EMC modules
- Best pieces - minimal calibration - PHYSICS
- Automatisations 4 large # of preamplifiers
- Qualitative test of all PreAmps

Motivation

- No access to PANDA EMC modules
- Best pieces - minimal calibration - PHYSICS
- Automatisations 4 large # of preamplifiers
- Qualitative test of all PreAmps
- HV, Noise, Linearity, DoubleBurst

Test Setup

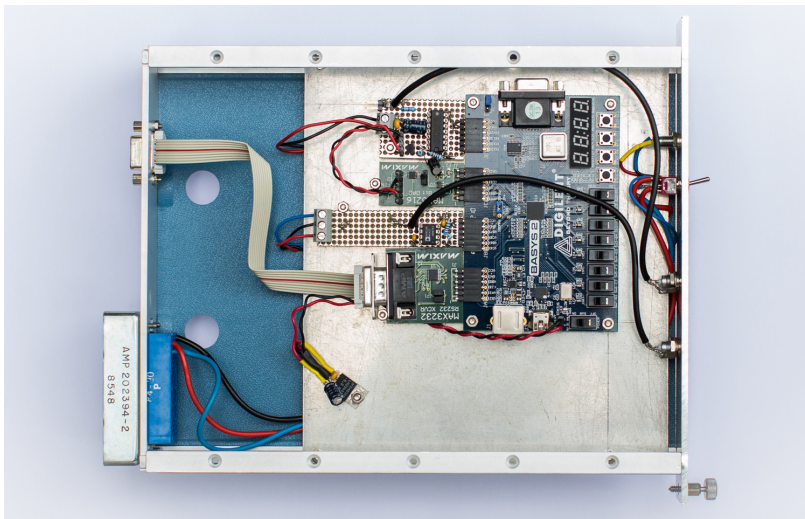
Concept Test Setup



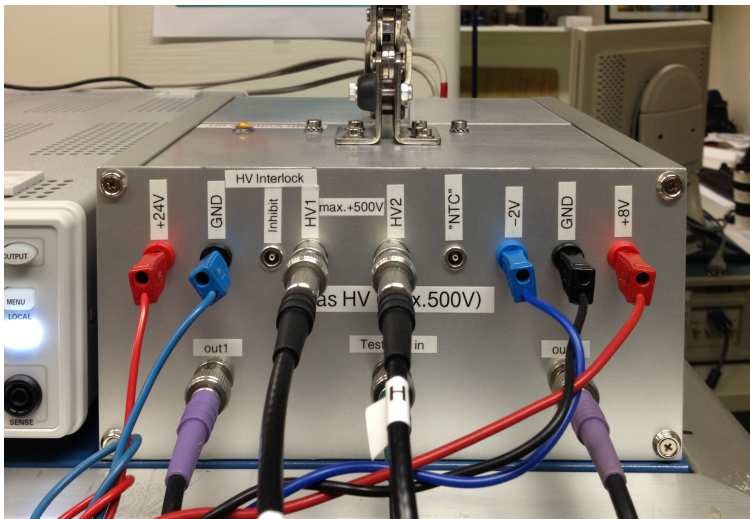
Test Lab.



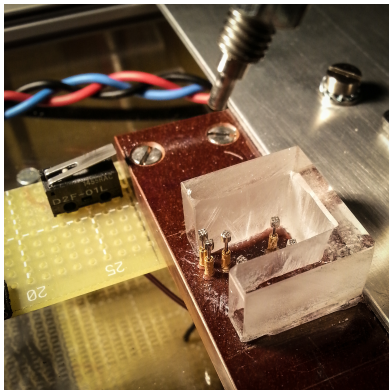
NIM FPGA Pulser Module



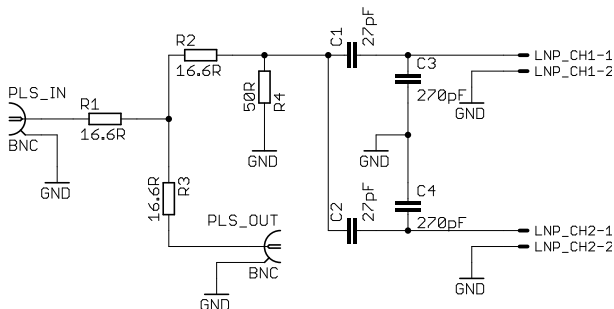
Test Box



Spring Probes



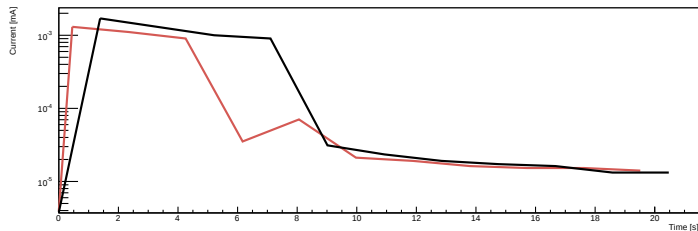
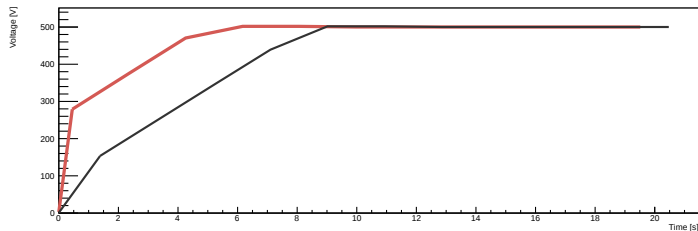
LNP input coupling schema





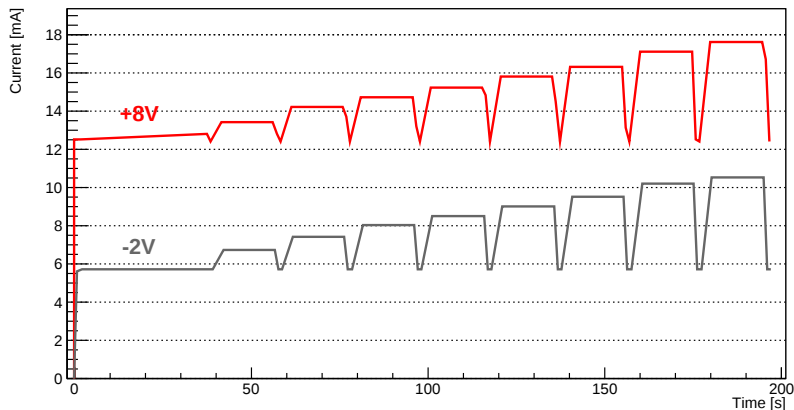
Test Measurements

Typical HV Measurement



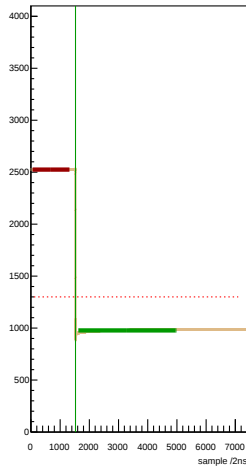
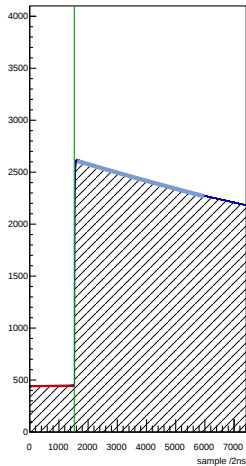
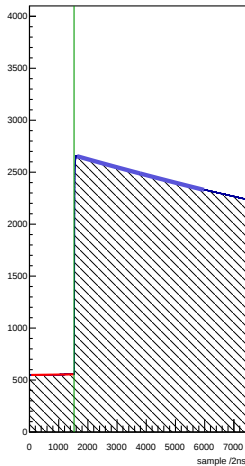
Typical Current Measurement

8 different amplitudes between min. → max., 10kHz countrate

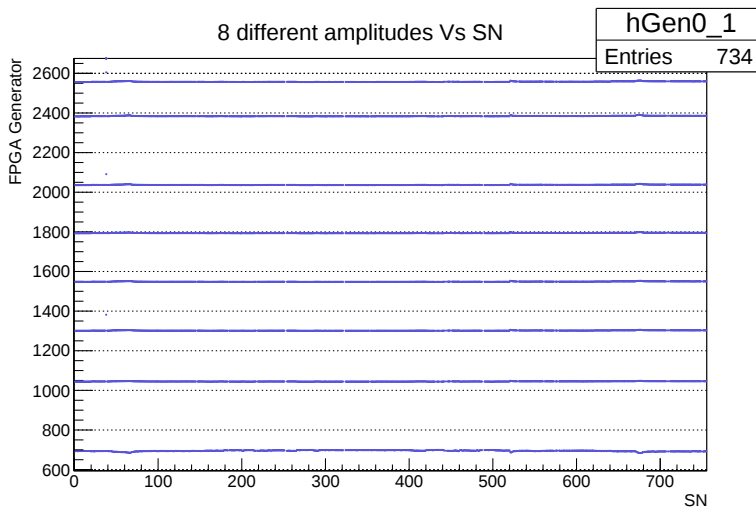


Typical Amplitude Extraction Signals

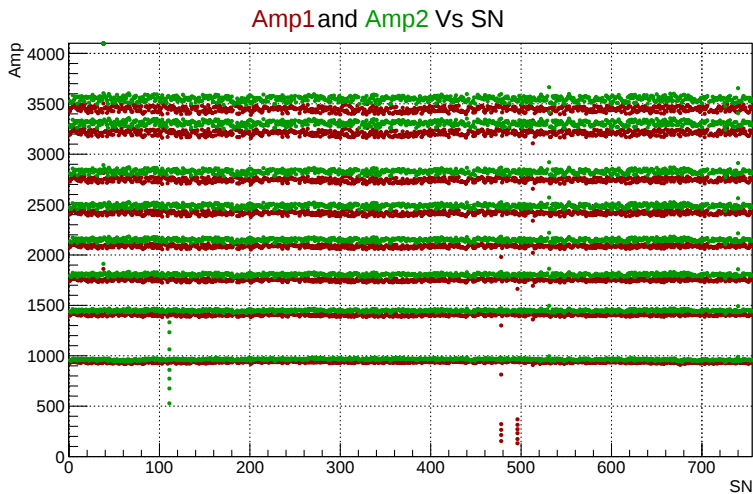
RAW/RAW_SN_0007/SADC_SN_0007_Nr_04.root



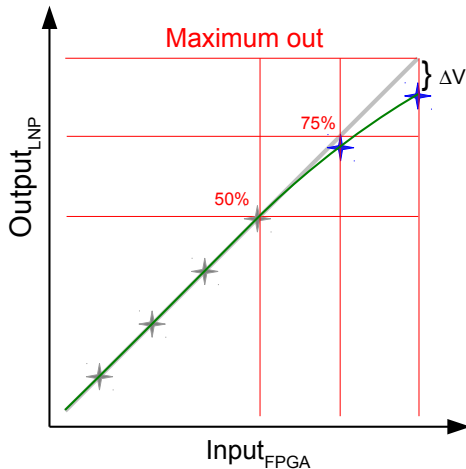
Generated signals Vs SN



LNP signals Vs SN

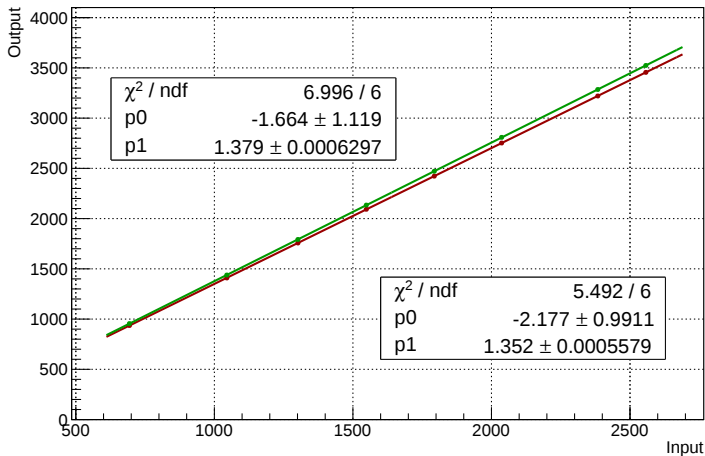


Amplitude Linearity Measurement

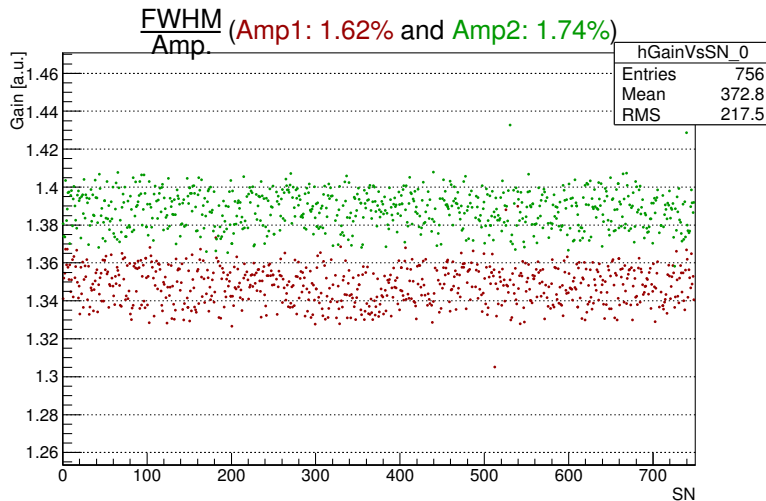


Amplitude Linearity Measurement

SN: 100 | gain (Amp1/Amp2)

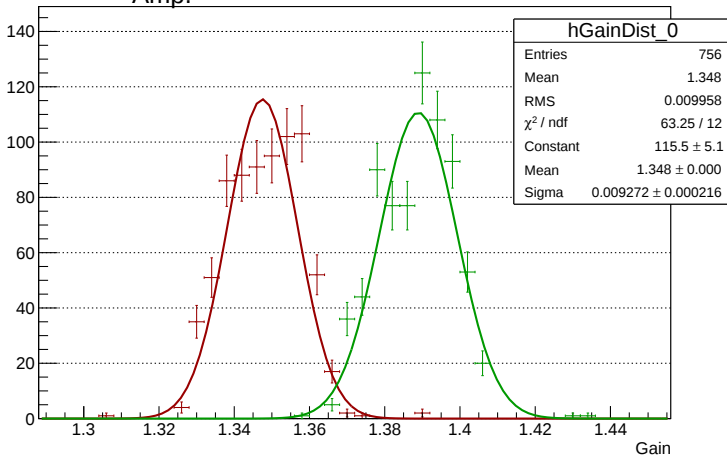


Gain Vs SN

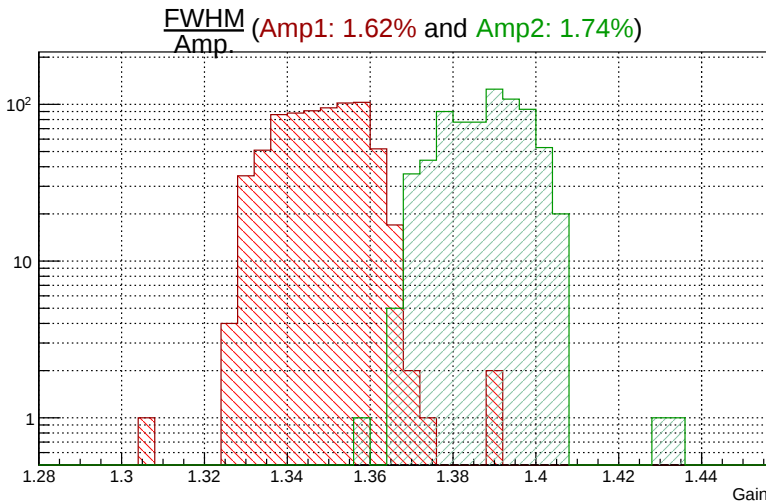


Gain Distribution

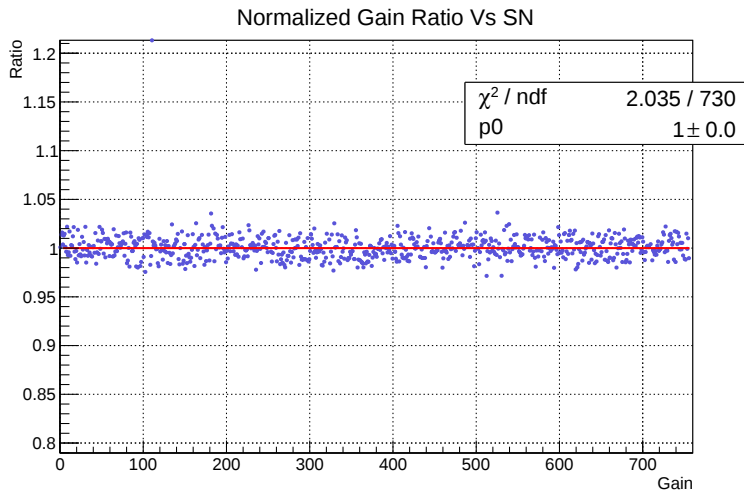
$\frac{\text{FWHM}}{\text{Amp.}}$ (Amp1: 1.62% and Amp2: 1.74%)



Gain Distribution / Log Y

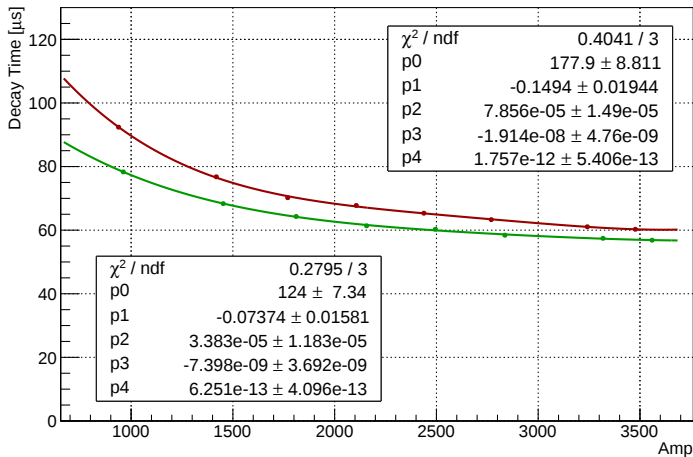


Normalized Gain Ratio - Gain1 / Gain 2

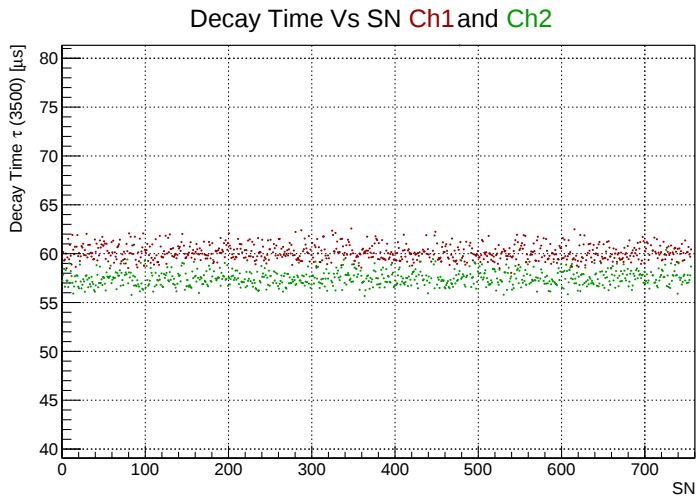


Gain Vs SN

SN: 701 | DecayTime Vs Amp (Amp1/Amp2)

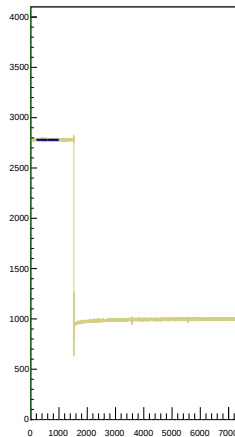
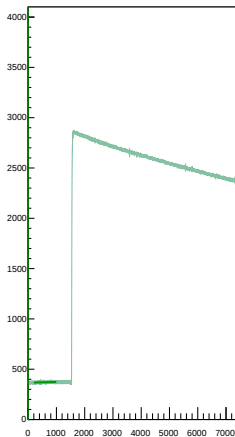
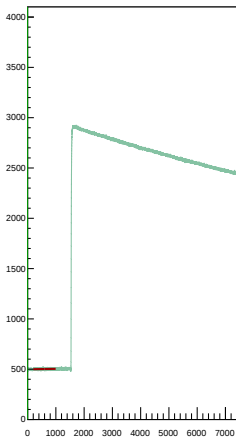


Decay Time Vs SN

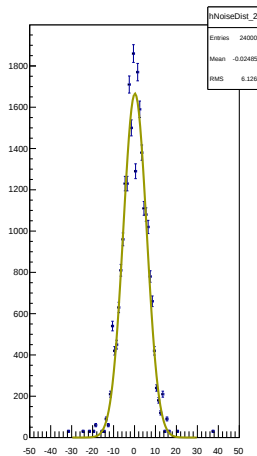
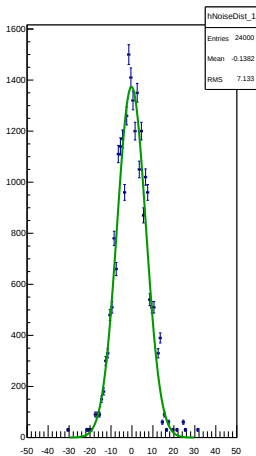
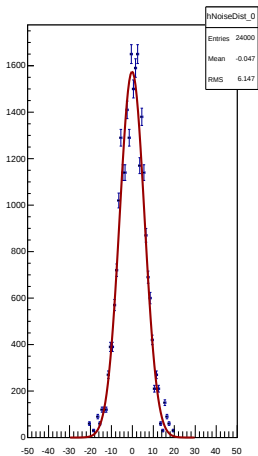


Typical Noise Extraction

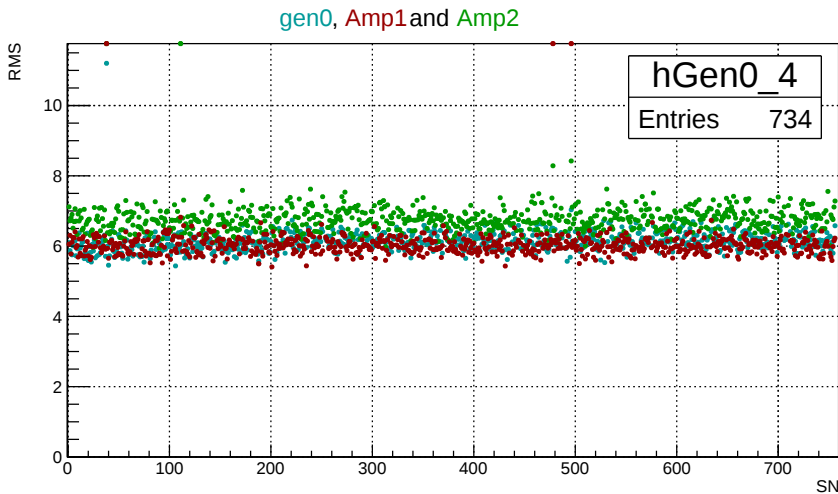
RAW/raw_SN_0001/SADC_SN_0001_Nr_05.root



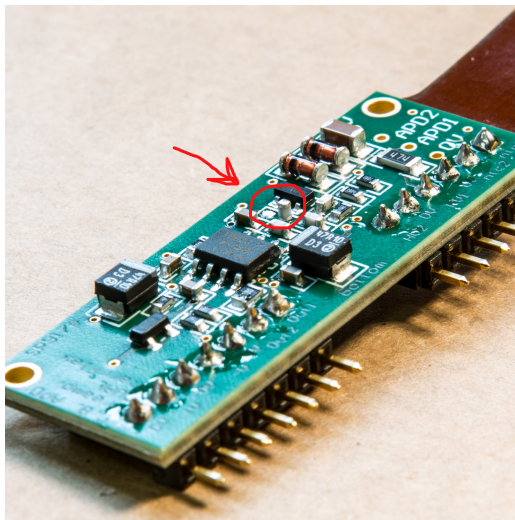
Typical Noise Distributions



RMS Noise Vs SN



Tombstone



Summary

- First serial test of large amount of LNP's - DONE!
- HV: Max. voltage / Current leakage
- Linearity: Amplitude / Double burst
- Noise: Baseline / Signal
- Time: Decay time / Exponential fitting
- Power: Current measurement vs count-rate
- Labeling: Labeling