

# Progress on Noise Removal

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# Noise Removal Tool in DataPrep

- Added a noise removal tool to remove high frequency noise and coherent noise
- “DoGroups” has to be disabled in DataPrep for coherent noise removal
- Every 16 **DAQ/Online** channels are grouped

```
physics.producers.caldata.DigitLabel: "tpcrawdecoder:daq"  
physics.producers.caldata.DoGroups: false  
  
services.RawDigitPrepService.AdcChannelToolNames: [  
    "digitReader",           # Read RawDigit  
    "pd_adcPedestalFit",    # Find pedestal  
    "adcSampleFiller",      # Subtract pedestal, trivial calibration  
    "pdsp_sticky_codes_ped", # Flag sticky codes  
    "pdsp_adcMitigate",     # Mitigate sticky codes  
    "pdsp_timingMitigate",  # Mitigate FEMB302 timing  
    "PdspNoiseRemoval",    # Noise removal  
    "adcVintageDeconvoluter", # Deconvolute  
    "adcThresholdSignalFinder" # Build ROIs  
]
```

# Event display by online channel

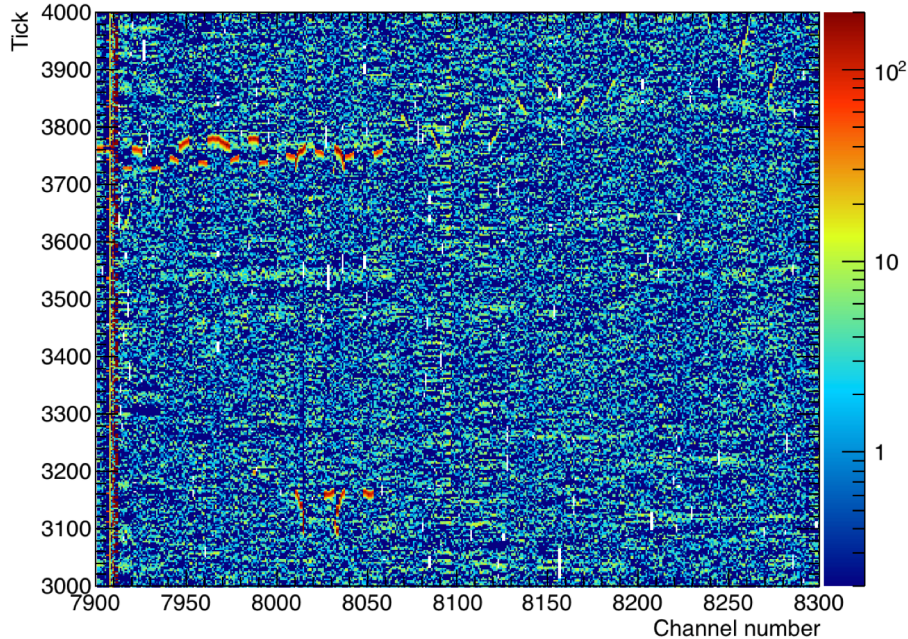
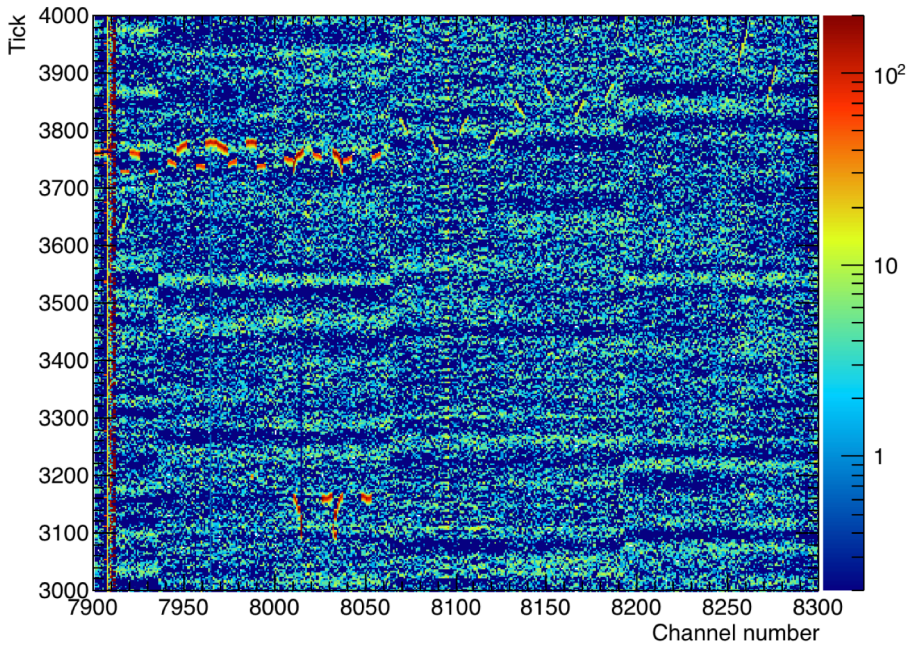
Run4696  
evt107

Before noise removal

Coherent noise removal

Tick:OnlineChannel

Tick:OnlineChannel-CR





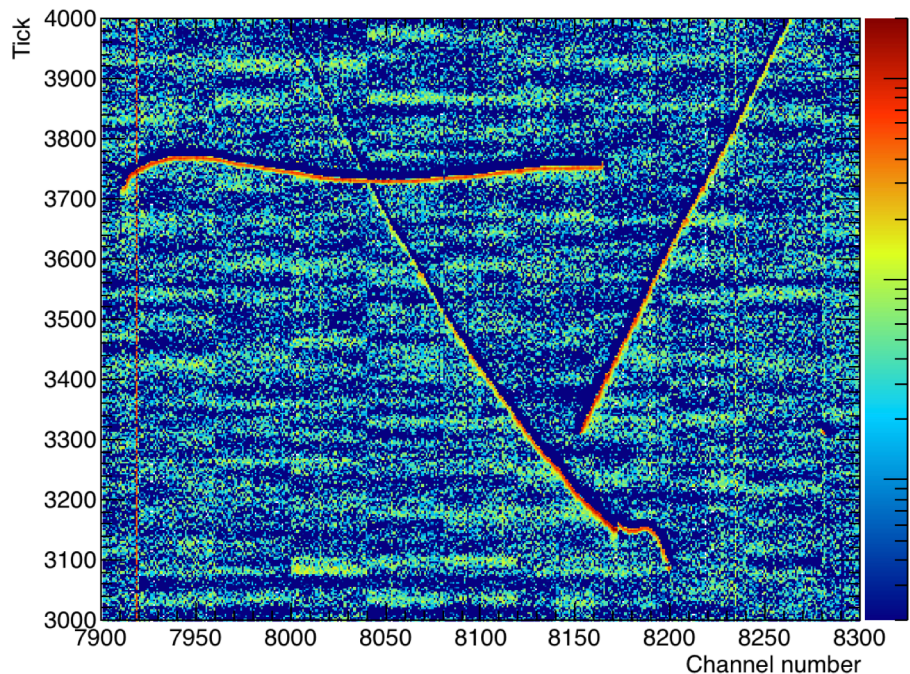
# Event display by offline channel

Run4696  
evt107

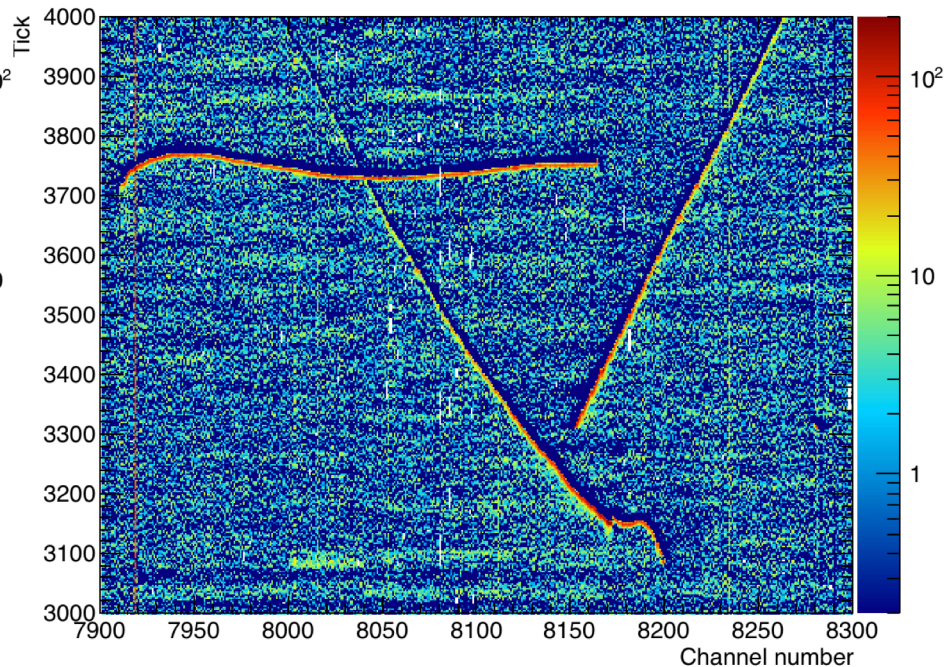
Before noise removal

Coherent noise removal

Tick:OfflineChannel



Tick:OfflineChannel-CR

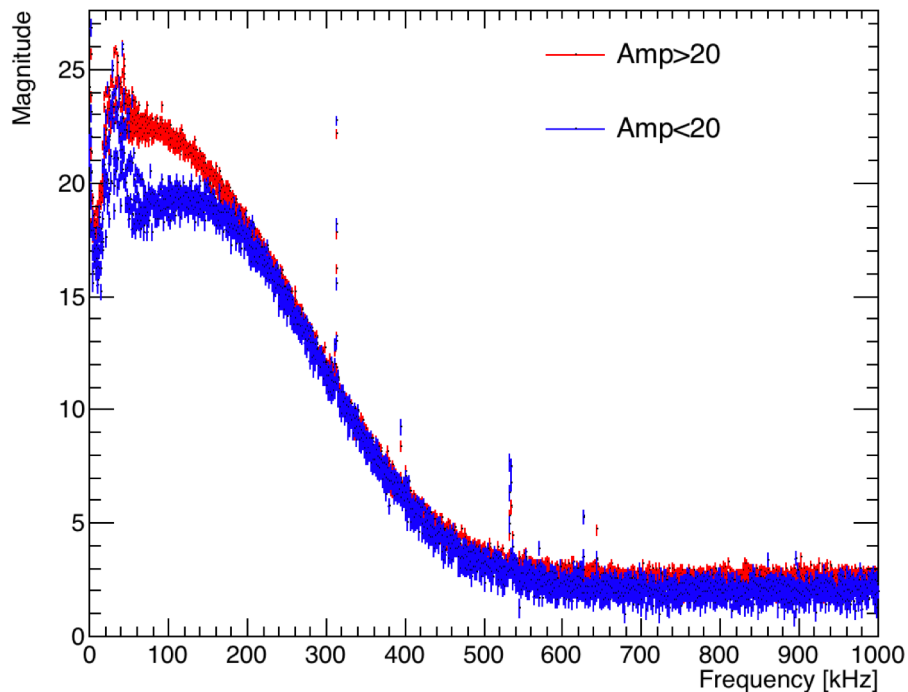


# FFT after coherent noise removal

Run4696  
evt107

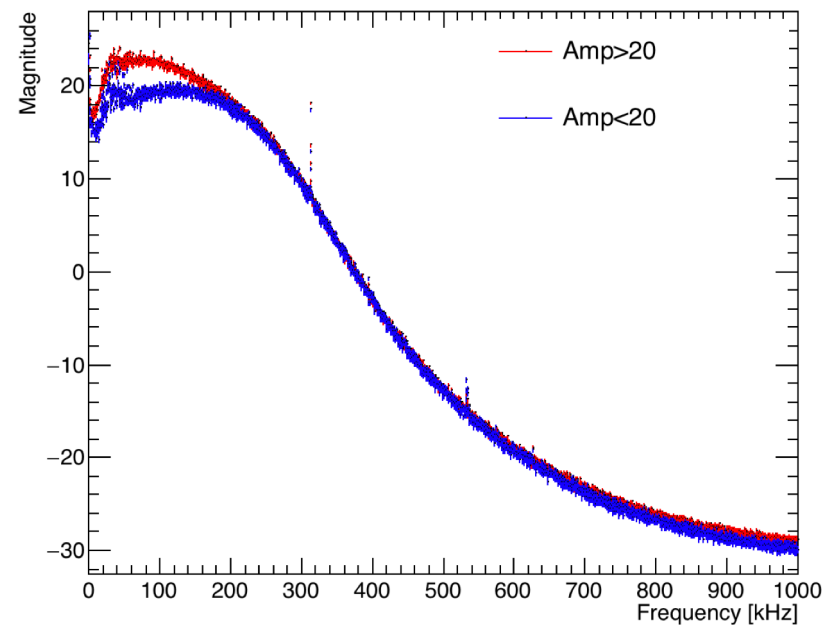
Before noise removal

FFT\_U-plane\_Apa3



Coherent noise removal  
+ Low pass filter (cutoff=300 kHz)

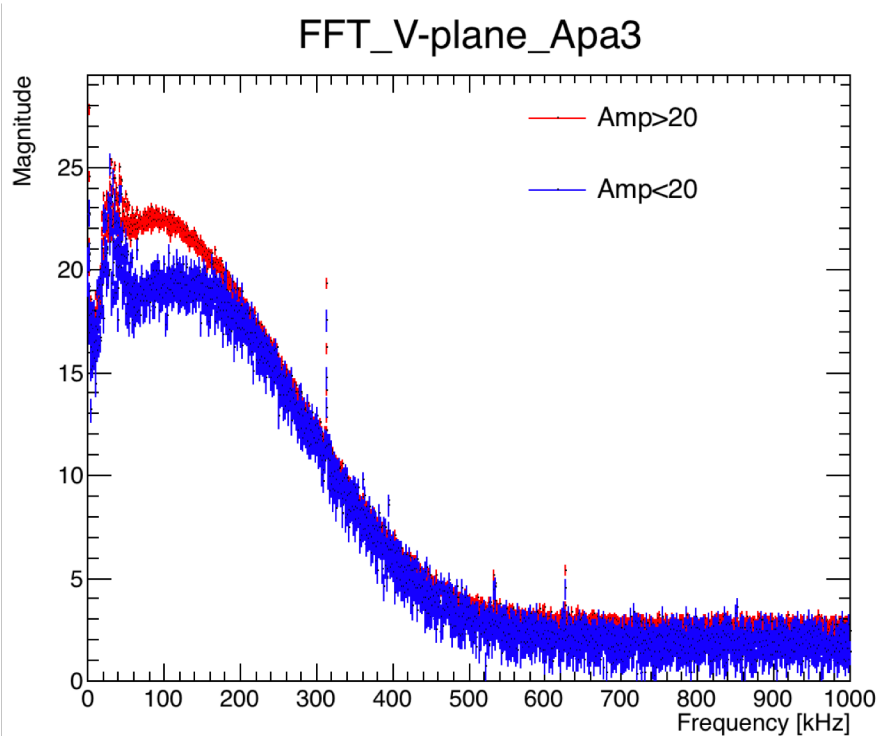
FFT\_U-plane\_Apa3



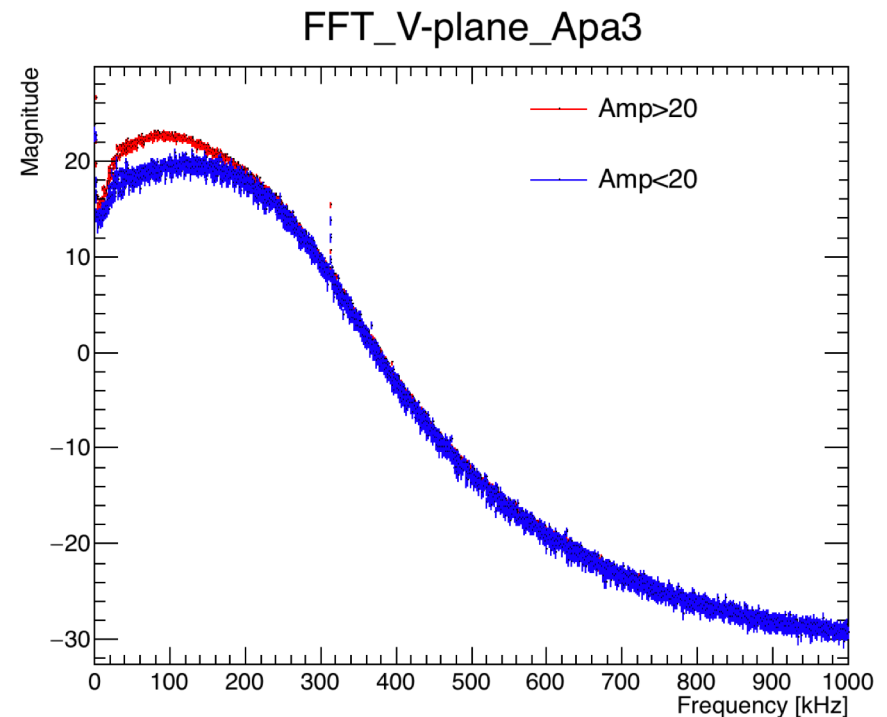
# FFT after coherent noise removal

Run4696  
evt107

Before noise removal



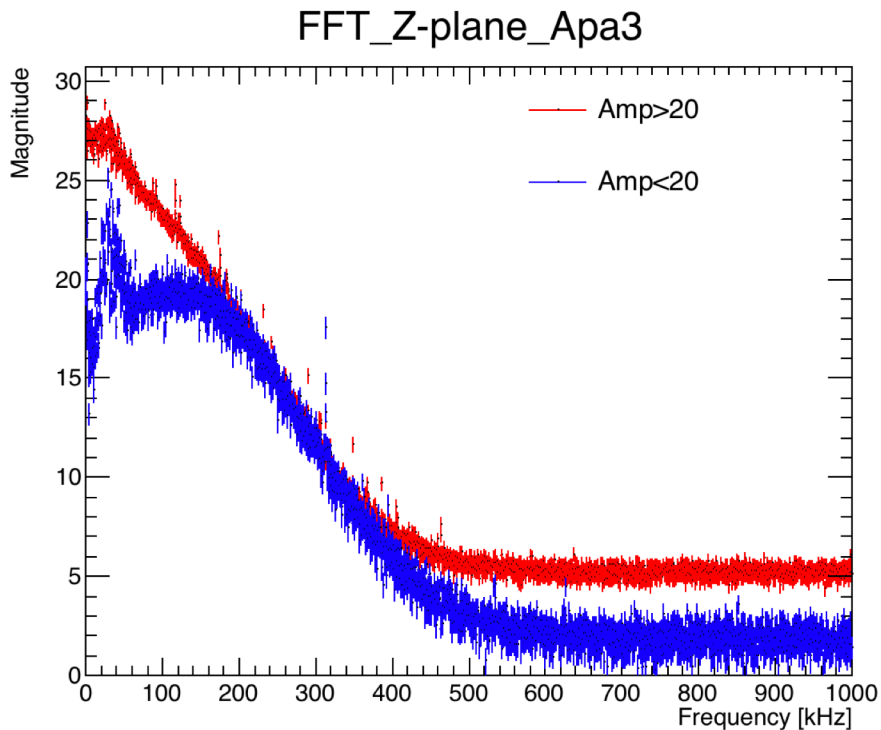
Coherent noise removal  
+ Low pass filter (cutoff=300 kHz)



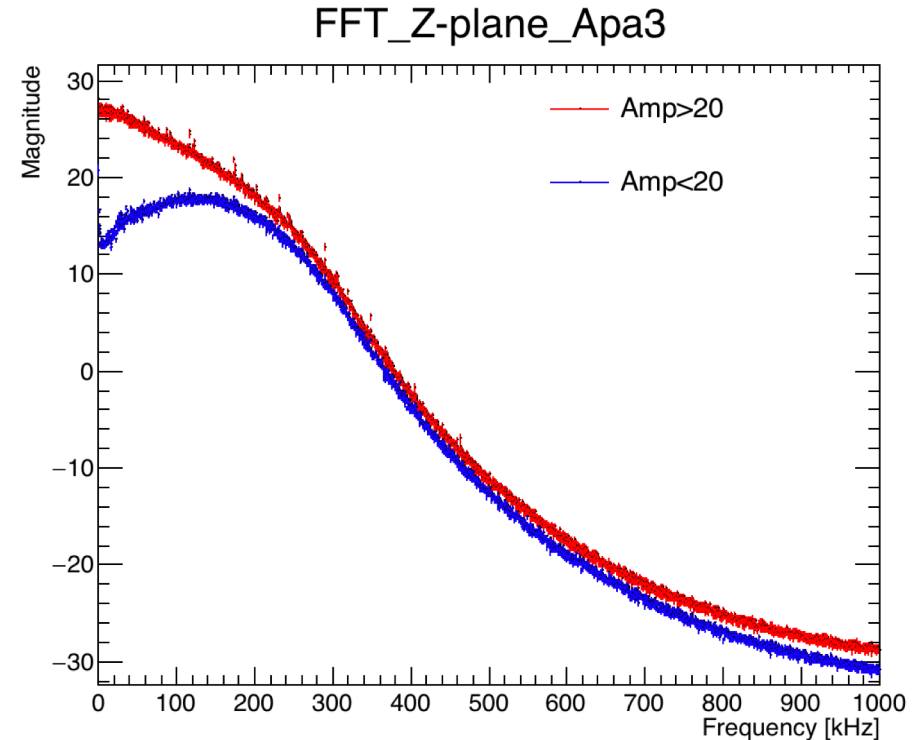
# FFT after coherent noise removal

Run4696  
evt107

Before noise removal



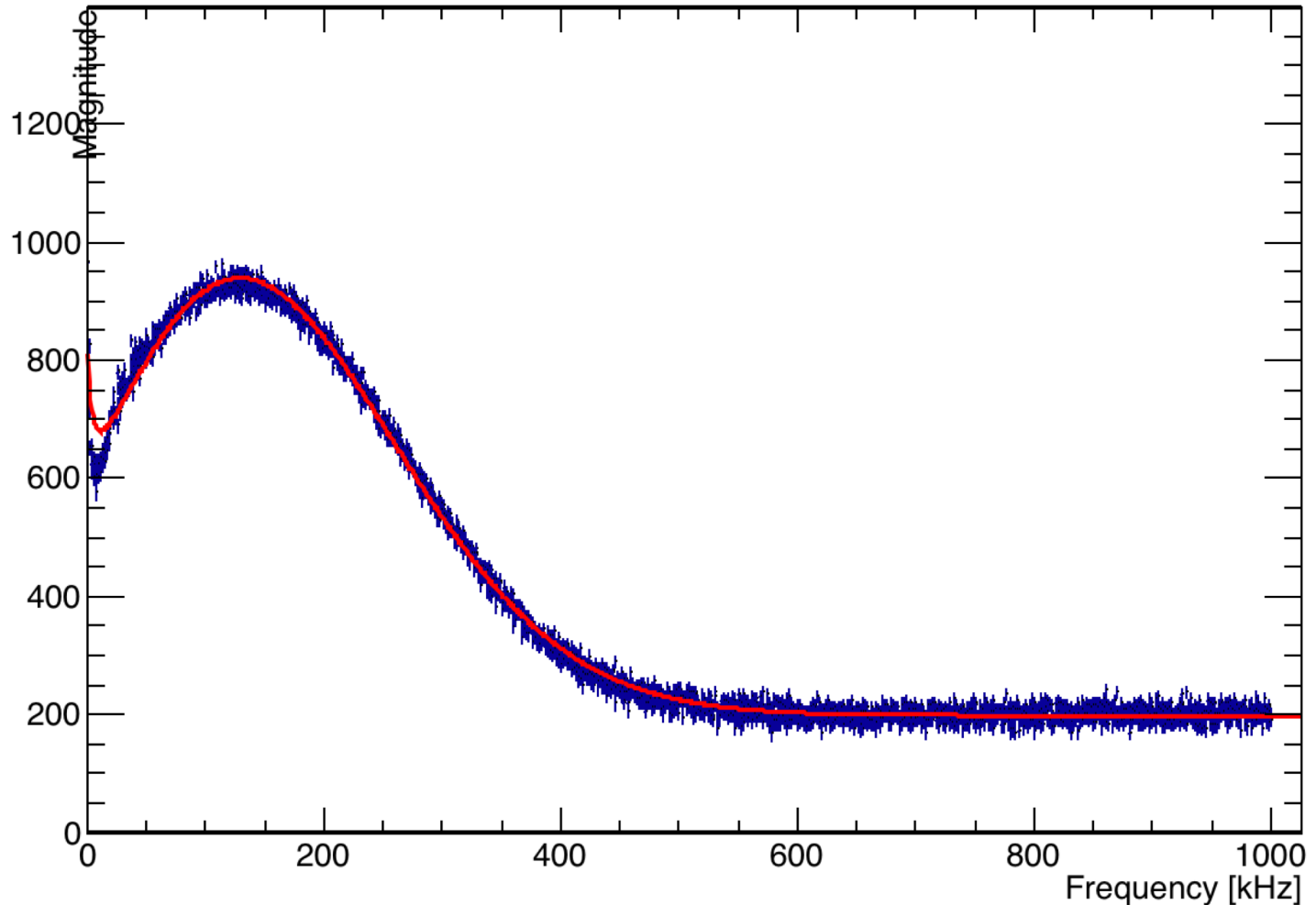
Coherent noise removal  
+ Low pass filter (cutoff=300 kHz)



# MicroBooNE noise model fit

Run4696  
evt107

Profiled FFT (Plane Z, APA0, noise)





# Summary

- Added a coherent noise model to DataPrep
- Tried to fit the incoherent noise with MicroBoo model
- Will tune the noise generator in LArSoft using real data