

# Analysis Note for 60H Dataset Relative Unblinding

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# High Level Summary

- Lead Analyst: Nick Kinnaird
- Support Analyst: James Mott
- Positron Reconstruction Method: Recon West
- Software Release: V9\_11\_00
- Dataset: gm2pro\_daq\_full\_run1\_60h\_5033A\_withfullDQC
- Histogramming Method: Weighted Ratio
- Gain Correction Method: Default in reconstruction
- Pileup Correction Method: Asymmetric shadow window
- Lost Muon Spectrum Extraction: put something here?
- Models for CBO and VW: Exponential envelopes, frequency from tracking analysis
- $R = -19.something \pm 1.somethingppm$  (blinding with common string)
- $\chi^2/NDF = 4211/4200something$

## Final fit function:

$$R(t) = \frac{2f(t) - f_+(t) - f_-(t)}{2f(t) + f_+(t) + f_-(t)}$$

$$f_{\pm}(t) = f(t \pm T_a/2)$$

$$f(t) = C(t)(1 + A \cos(\omega_a t + \phi))$$

$$C(t) = 1 + A_{cbo} e^{-t/\tau_{cbo}} \cos(\omega_{cbo} t + \phi_{cbo})$$

# Chapter 1

## Analysis Procedures

### 1.1 Key parameters in reconstruction method

Find out procedures used in 60 hr production dataset

### 1.2 Analysis Data Preparation Procedure

git branch: gm2analyses branch feature/KinnairdAnalyses Majority of code located in gm2analyses/macros/RatioMacro folder.

1. Submit jobs to OSG to run the rootTreesAndLostMuons.fcl file which produces root trees of positron hits using the ClusterTree analyzer module and coincident MIP hits using the TestCoincidenceFinder analyzer module.
2. Submit jobs to Fermigrid to produce histograms from root trees using the ClusterTreeToHistsPileup.C macro in RatioMacro/HistMaking. Beyond standard threshold histograms this macro produces pileup and lost muon histograms all within the same root file.

### 1.3 Histogramming Procedure

Method: Weighted Ratio (threshold)