

DMC HT Ba T2Z1 First Sample

08-04-2015

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HT Meeting

Overview

1. Data Selection and Cuts
2. Energy
 - precoiltNF
 - ptNF
 - ptNF - Time
3. Phonon Partition
 - px py
 - pz
4. Charge Partition
 - qrpart qzpart
5. Ionization Energy
 - precoiltNF qsummaxOF
 - ptNF qsummaxOF no cuts
 - ptNF qsummaxOF with cuts
6. Energy Yield
7. Conclusions

Validation of the first HT Barium T2Z1 sample

- ~1,600,000 pulses
- Using noise from:
 - All of 1306 bg
 - All of 1305 bg
 - All of 1304 bg
- ~1,500,00 events (post-processing)

Simulation type: Ba_vacuum_t2z1

Basic Cuts

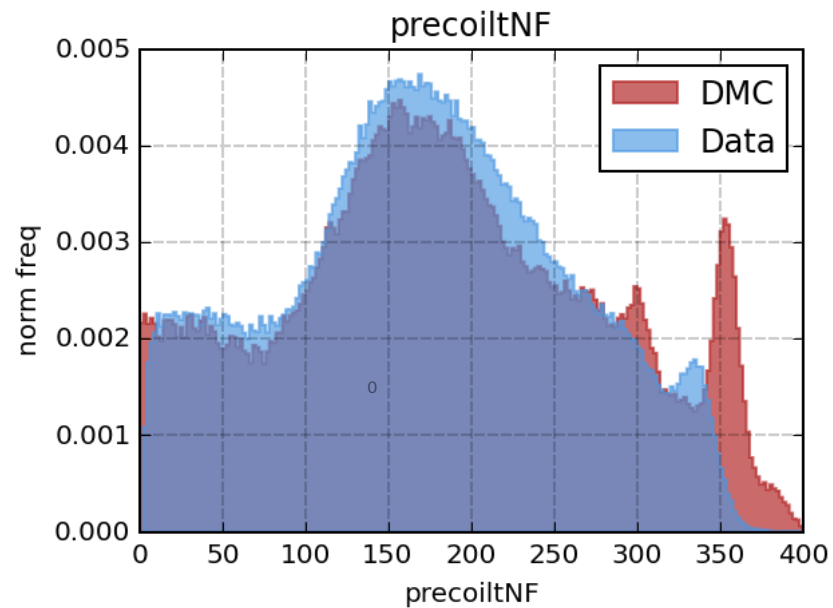
- $5 < \text{ptNF} < 800$
- Data only: $.7 < \text{ytNF} < 1.3$ (DMC is off)
- ~cRandom_133 (data only)
- ~cGoodRandom_133 (data only)

Total Events		
DMC: 1450905	Data: 19431502	
Passing Events		
DMC: 1450665	Data: 557376	
Passage Fraction		
DMC: 0.9998	Data: 0.0287	

Energy

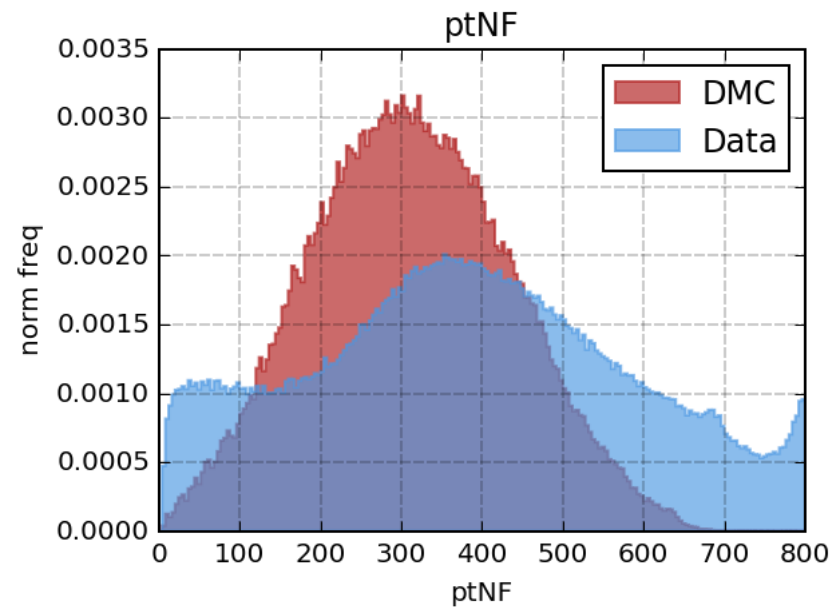
precoiltNF

- Major distribution seems to be in agreement
- DMC shows two peaks in the tail
 - at 300keV and 356keV
 - but data shows only one at ~330keV

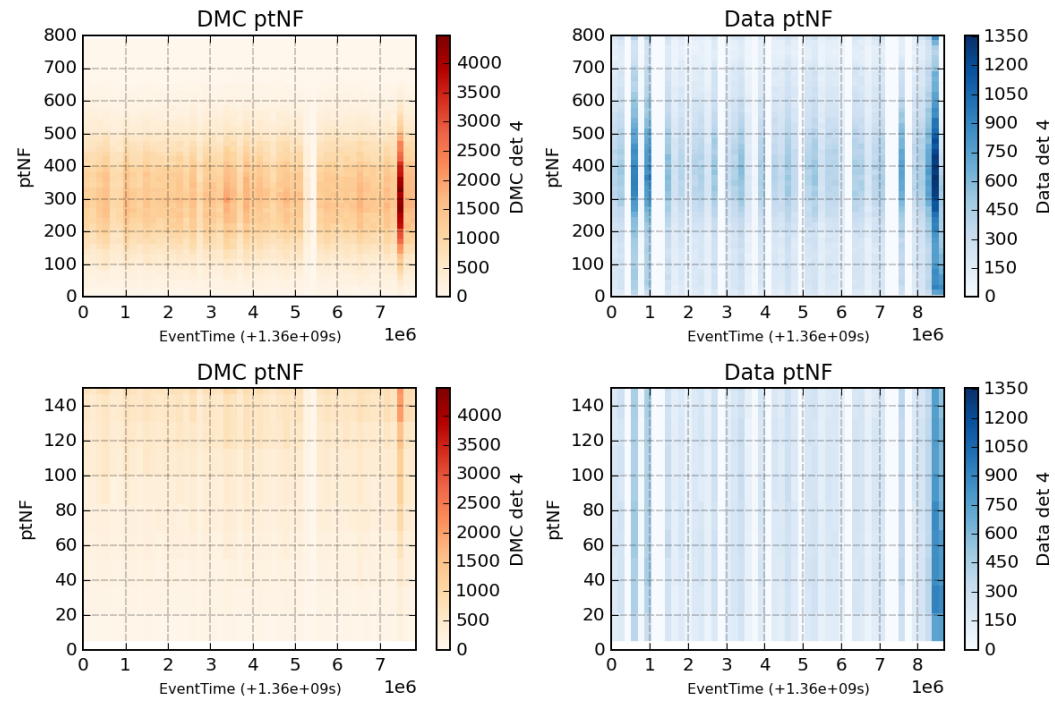


ptNF

- Distributions don't match up
- Seems to be an indication that the luke phonon energy is off



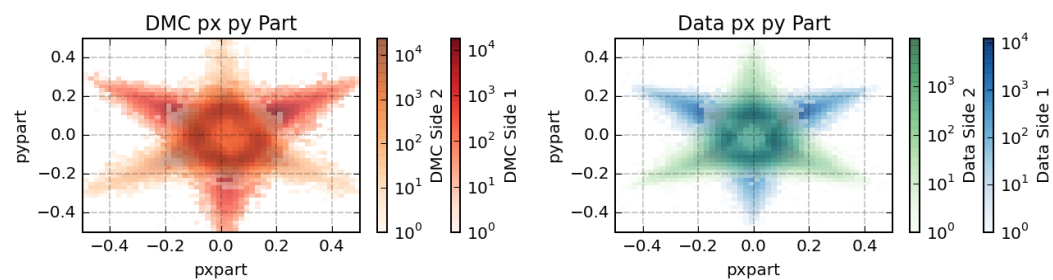
Energy-Time distributions seem to be in agreement



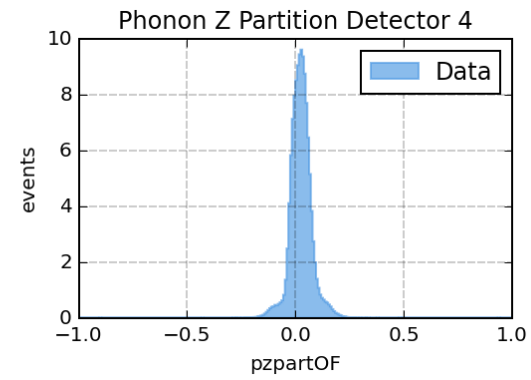
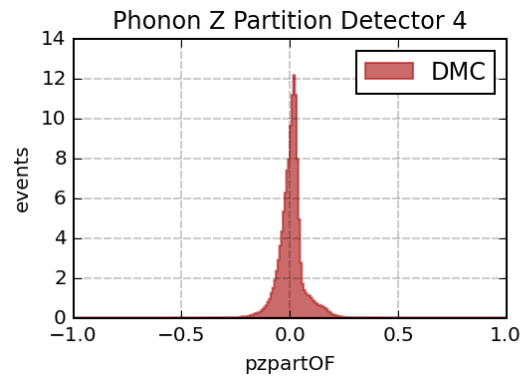
Phonon Partition

px py Partition

- Phonon partition plots are in very good agreement
- Data px py partitions seem slightly narrower



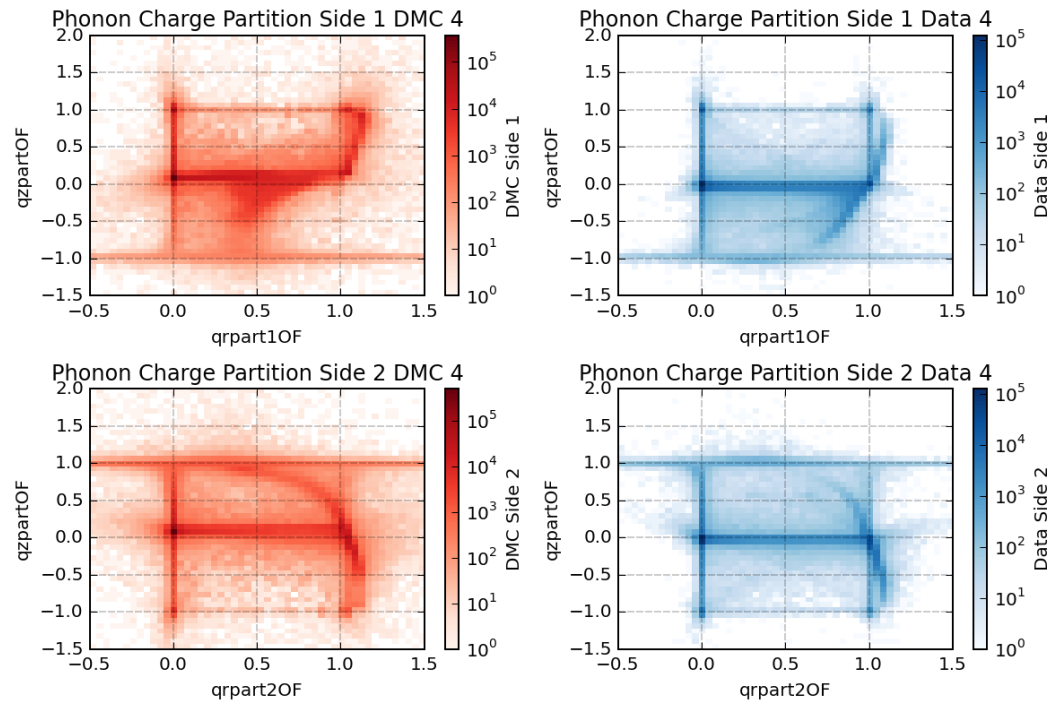
pz Partition



Charge Partition

qrpart qzpart

- Charge partitions are also in good agreement
- Slight differences, particularly in side 1

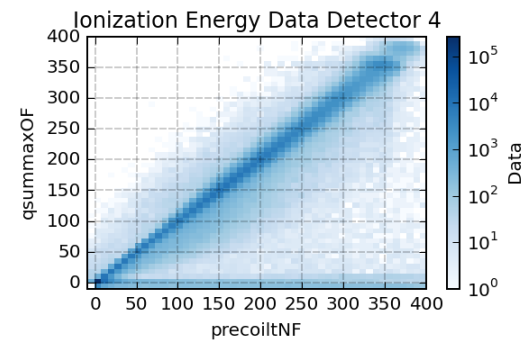
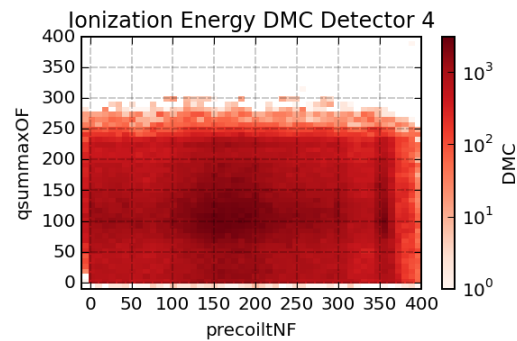


Ionization Energy

- qsummax seems to be way off which could be causing problems in other quantities
- ptNF is related with qsummax in the DMC pre-processing stage
- ytNF of course is affected ($qsummaxOF / precoiltNF$)
- Need to revise qsummaxOF !

precoiltNF qsummax

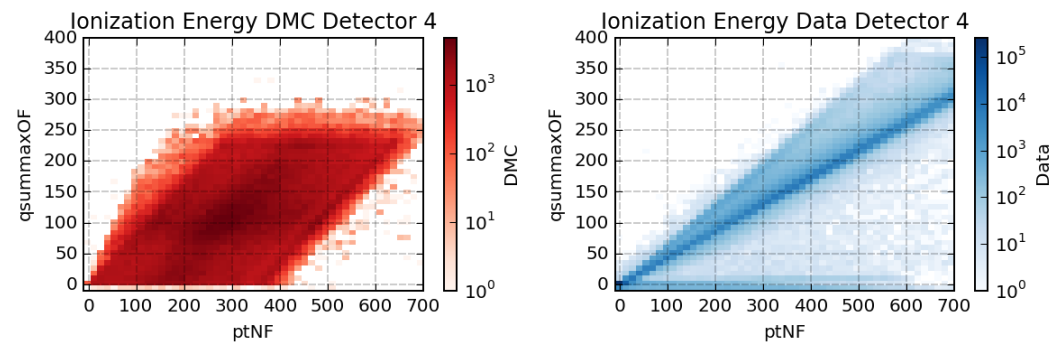
DMC: no cuts , Data: only no-randoms cuts



ptNF qsummaxOF

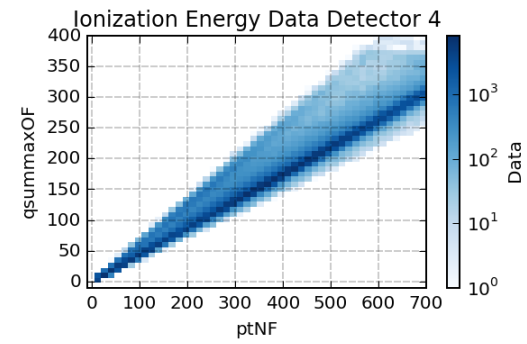
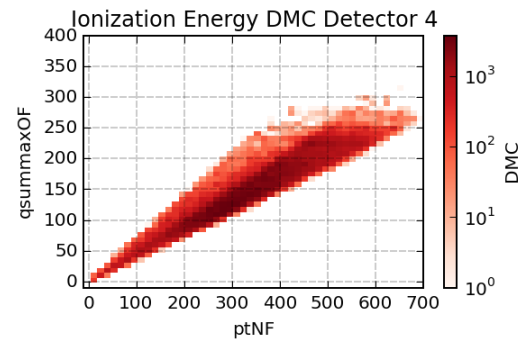
DMC: no cuts , Data: only no-randoms cuts

- ptNF comes from the amplitude of the phonon pulse
- this is related to qsummax in the pulse calibration/scaling stage (before processing, after DMC pulse generation)



ptNF qsummaxOF

(DMC: ptNF + ytNF cuts , Data: ptNF + ytNF cuts)

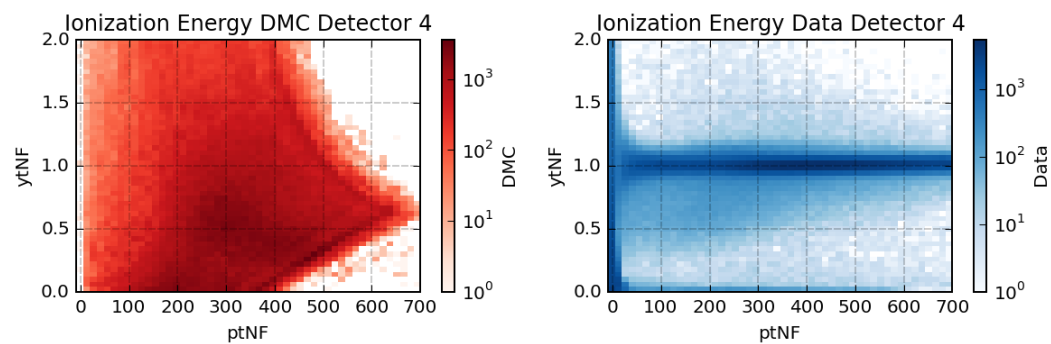


Energy Yield

ytNF

(DMC: no cuts , Data: only no-randoms cuts)

- ytNF is obtained from the ratio of qsummaxOF and precoiltNF



Conclusions

- Some RQs are already in good agreement, especially the non-related with qsummax
- Need to revise qsummaxOF (in the FET/TES calibration stage, post-DMC, pre-CDMSBats could be the problem)
- Getting close to having good HT Ba DMC simulations!

