

# DchSim Status

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## Crosstalk in Data (review)

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Seen in two forms:

- Hits depress charge on geometrically adjacent wires.  
(ANALOG CROSSTALK)
- Spurious TDC hits are generated in cells that share chips with real hits. (TDC CROSSTALK)

## Current Crosstalk Model in SP5 (review)

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- Crosstalk is created by generating hits with random time (>original hit time), and zero charge, in cells that are geometrically adjacent to a real hit.
- These hits are then merged with all other hits associated with that cell by summing the charges and assigning the *earliest* time as the new time for that hit. Some fraction of the hits (half?) will now have incorrect times and be lost.
- This crosstalk method is a “blend” of the two effects seen in data.
- The effect of this type of crosstalk will probably show up as a “stealth” inefficiency, depending only slightly on multiplicity.

## An Improved Model (1)

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- Analog Crosstalk (implementation exists)
  - Nearest neighbors (like SP5).
  - Reduces charge on ALL adjacent hits. (adjustable parameter)
  - Chamber gain must be increased to compensate for the average lost charge.
  - Affects efficiency on same track only when charge falls below threshold. This is a secondary effect and should be only a weak function of multiplicity.

## An Improved Model (2)

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- TDC crosstalk (implementation exists)
  - Hits cause crosstalk in shared amplifier channels (4). Simple model just groups cells by MOD(4). Crosstalk hits are generated about 10% of the time. (adjustable parameter)
  - Spurious times are generated by adding 50 ns to “real” hit.
  - Should only affect adjacent tracks, therefore inefficiency will be multiplicity dependent.

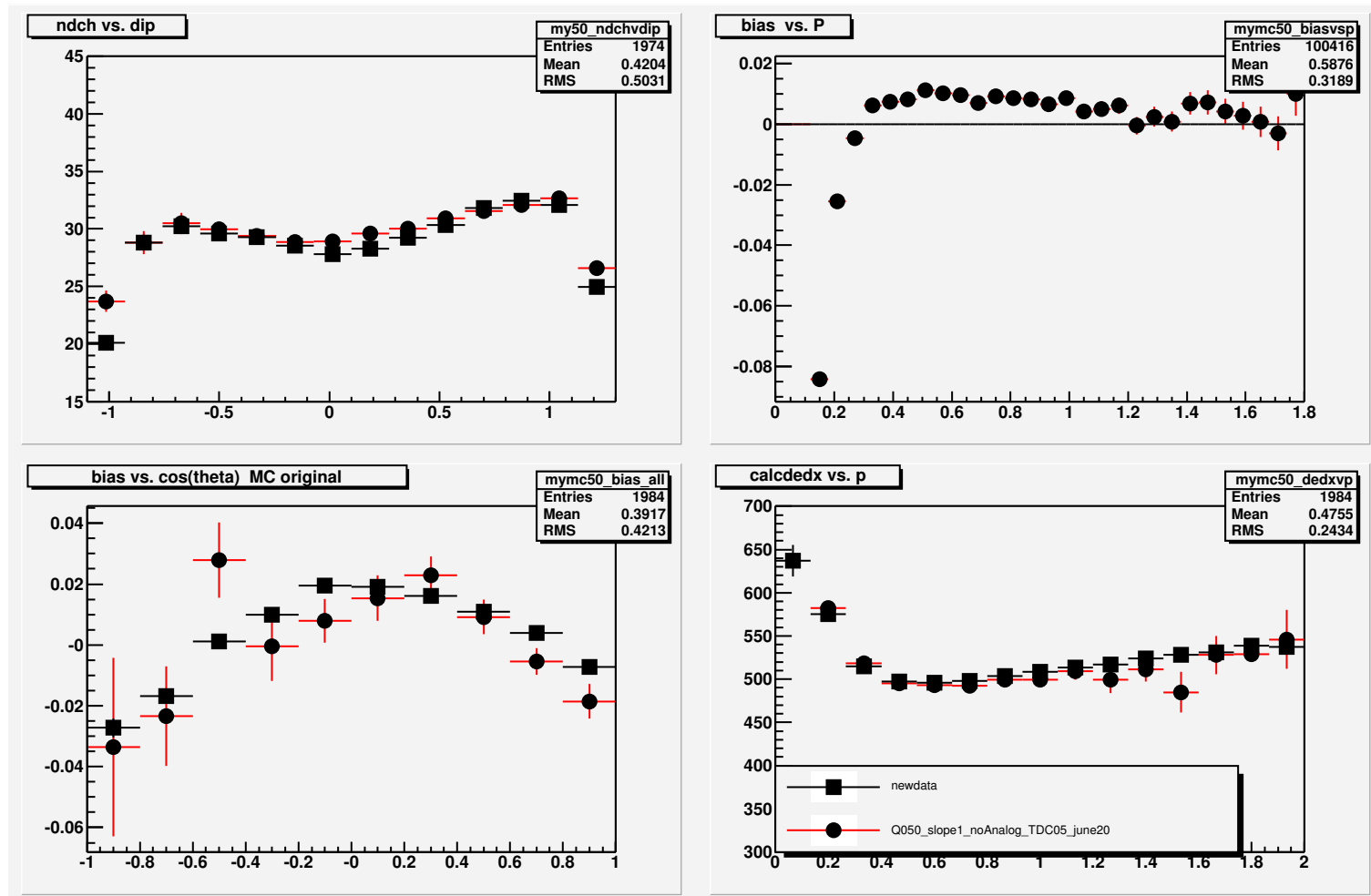
## Successes

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- Hit Efficiency of pions from Kshorts matches data
- $dE/dx$  of pions from Kshorts matches data

Normally, success with hadronic data seems to track our success with pions.

# Current “best” settings

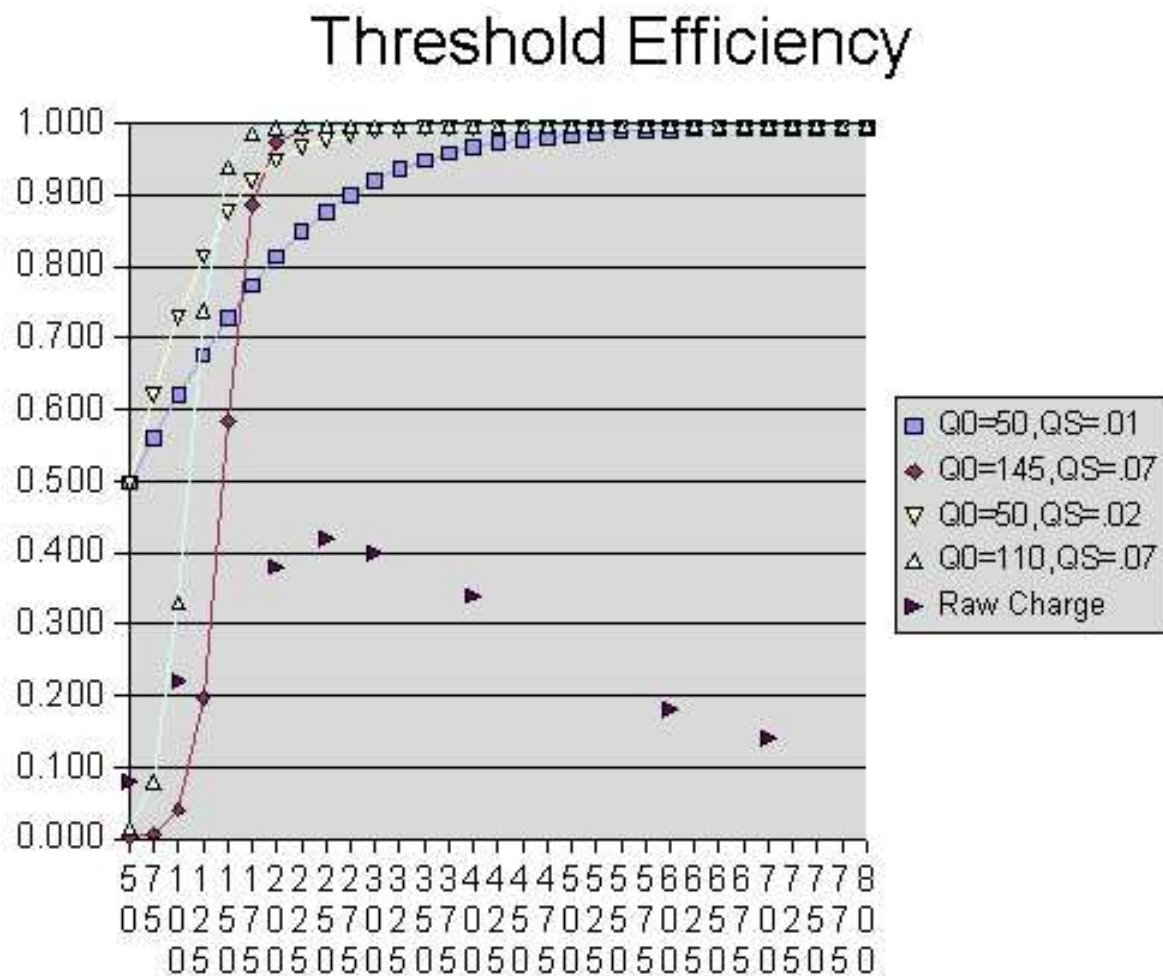


## Key Elements of the model

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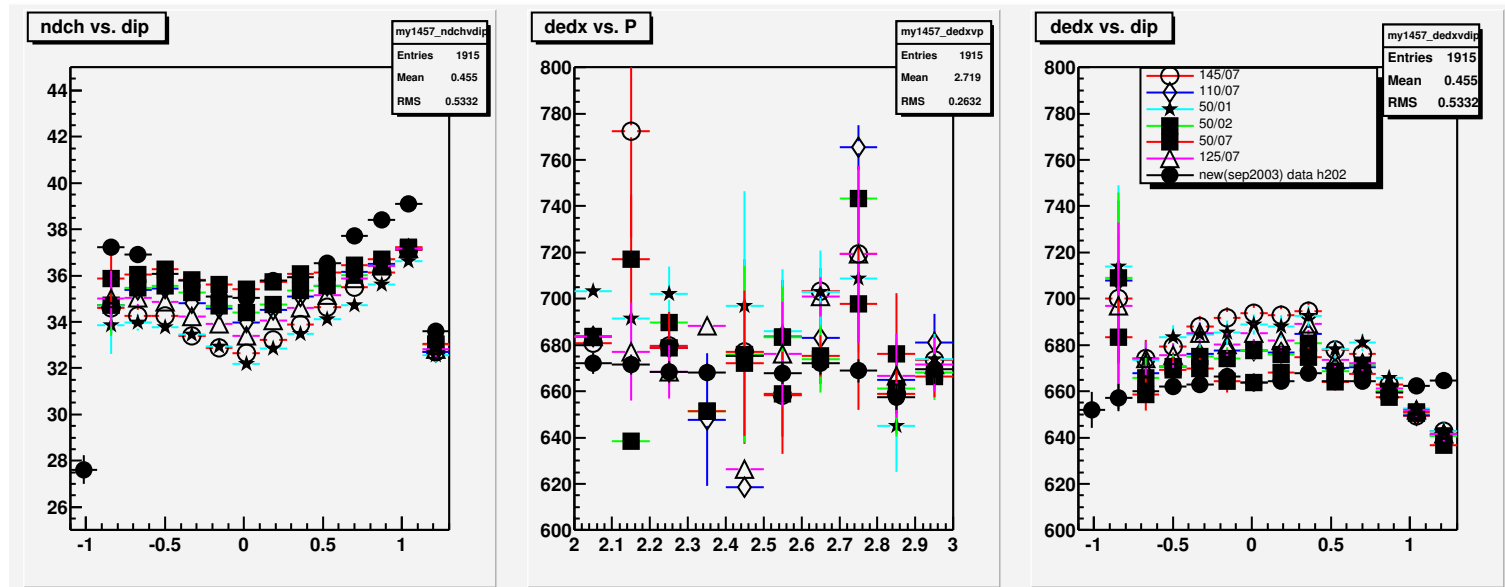
- Threshold Function
  - Threshold
  - Slope
  - Plateau Efficiency
- Crosstalk- introduces multiplicity dependence.
  - Analogue: Charge suppression by adjacent hits.
  - TDC: Spurious hits created by "real" hits in same amplifier chip.
- Scale factor: currently use mcdatascaling. Can also use the Bethe-Bloch distortion parameters.

# Different Threshold parameter choices



# Worries

- Bhabha efficiency and dE/dx do not match data as well as pions



## Short term work list

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- Need to get the new crosstalk code tagged and available.
  - Would like to see efficiency vs. ntracks.
  - Would like to check agreement with raw charge distribution.
  - Would like to check Kaons.
- What is going on with Bhabhas?
- Have enough information to make SP7 better (than SP5).