



Z Pt Discriminator

L1Sim Readiness Review

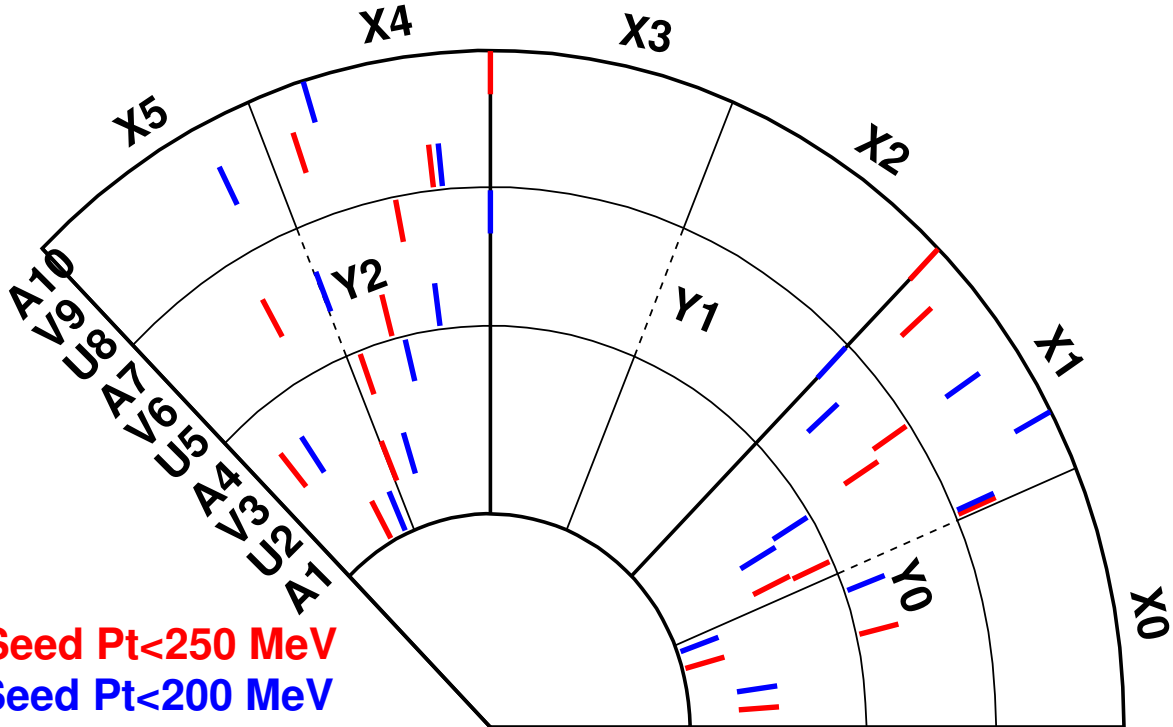
August 1st, 2005

SLAC

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ZPD Algorithm



A10 Seed Pt < 250 MeV
A7 Seed Pt < 200 MeV

- Input stretched TSF segments (all layers)
- Start with seeds in A10 or A7
- Combine segments to form seed tracks
- Feed seed track segment to fitter
- Fit for $\tan(\lambda)$, z_0 , and Pt
- Select final tracks based on z_0 (and other cuts)
- Final product: Z track objects (several)
- To GLT: 4 bit word for each of 8 boards at clk4

Much easier to simulate, as all hardware code in hand



ZPD Simulation Code



Module

Input

Output

L1DZpdReducer vec<L1DTsfSimDigi> vec<L1DZpdInputSeg>

Latch TSF segments clk8->clk4, select good segments

L1DZpdFinder vec<L1DZpdInputSeg> vec<L1DZpdSeedTrk>

Find seed tracks from segment patterns
Select best segments along seed track for fitting
Calculate course $\tan(\lambda)$ and pt

L1DZpdFitter vec<L1DZpdSeedTrk> vec<L1DZpdFitTrk>

Perform single-pass chi2 fit in integer arithmetic

L1DZpdDecisionModule vec<L1DZpdFitTrk> L1DZpdDecisionSimDigi

Perform final cuts on Z tracks

L1DZpdDecisionStretcher L1DZpdDecisionSimDigi

Final formatting for GLT



ZPD Configuration



ZPD LUT

- Large LUTs with **many** configurable params.
- Core information contained in base objects

L1DZpdBasicLut, L1DZpdDecisionModLut

- These objects in configDB
- Must build L1DZpdLut TC on fly for IR2
- Custom ConfigProxy to build L1DZpdLut for simulation/offline

At least months of work to get this all working
Really annoying extra work due to **R16-R18**

No need for fallback, in configDB from start!

ZPD Latencies

- Few extra numbers (6) which were forgotten in a flat file, including latencies
- Loaded from **L1DBltZpdSimpleConfig**

Everything in configDB!

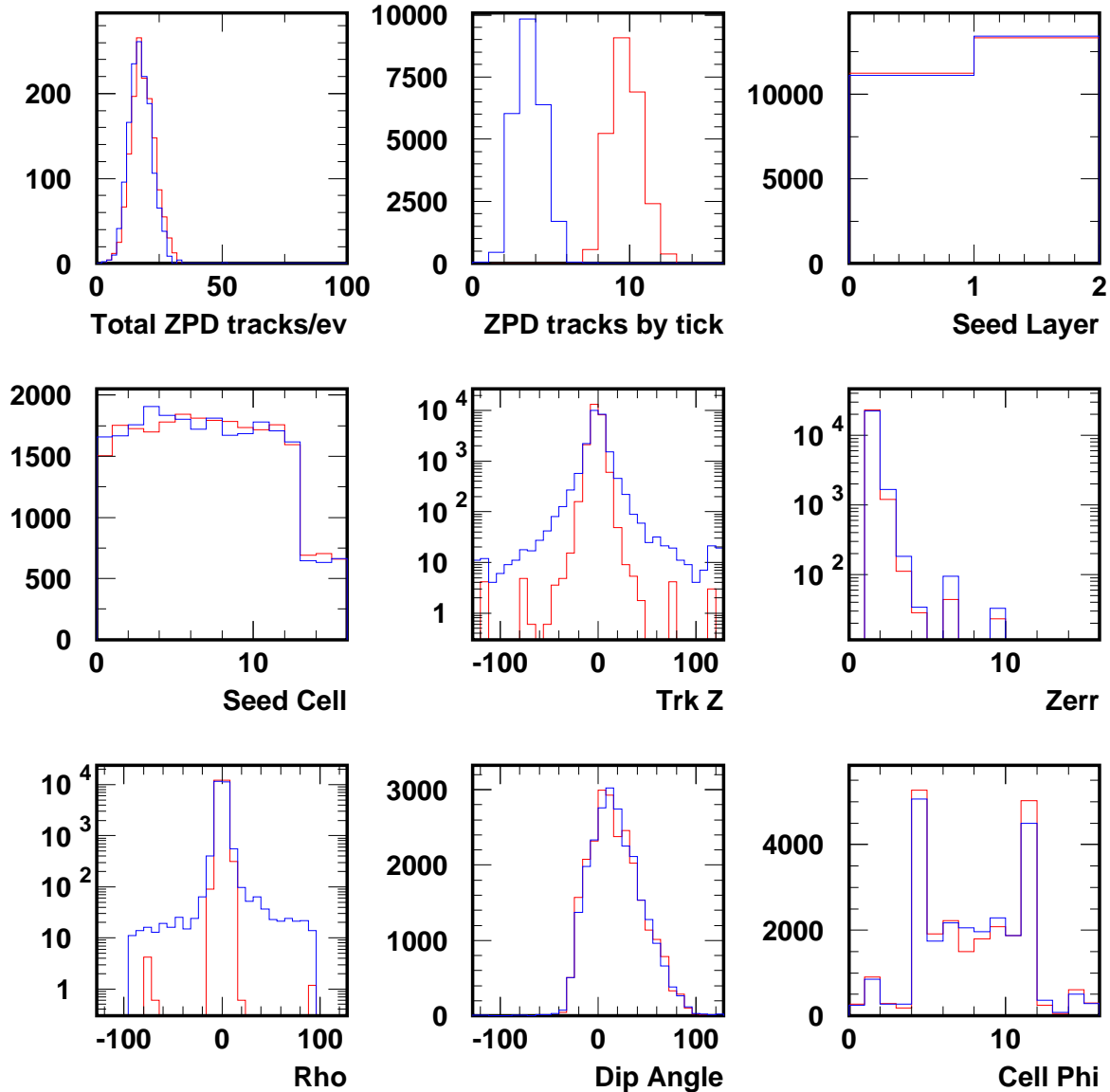


ZPD MuPair Tracks



r54505-L1Sim Mu

2005/07/31 23.45



r54505 vs newSim

We have no random background for Run5!

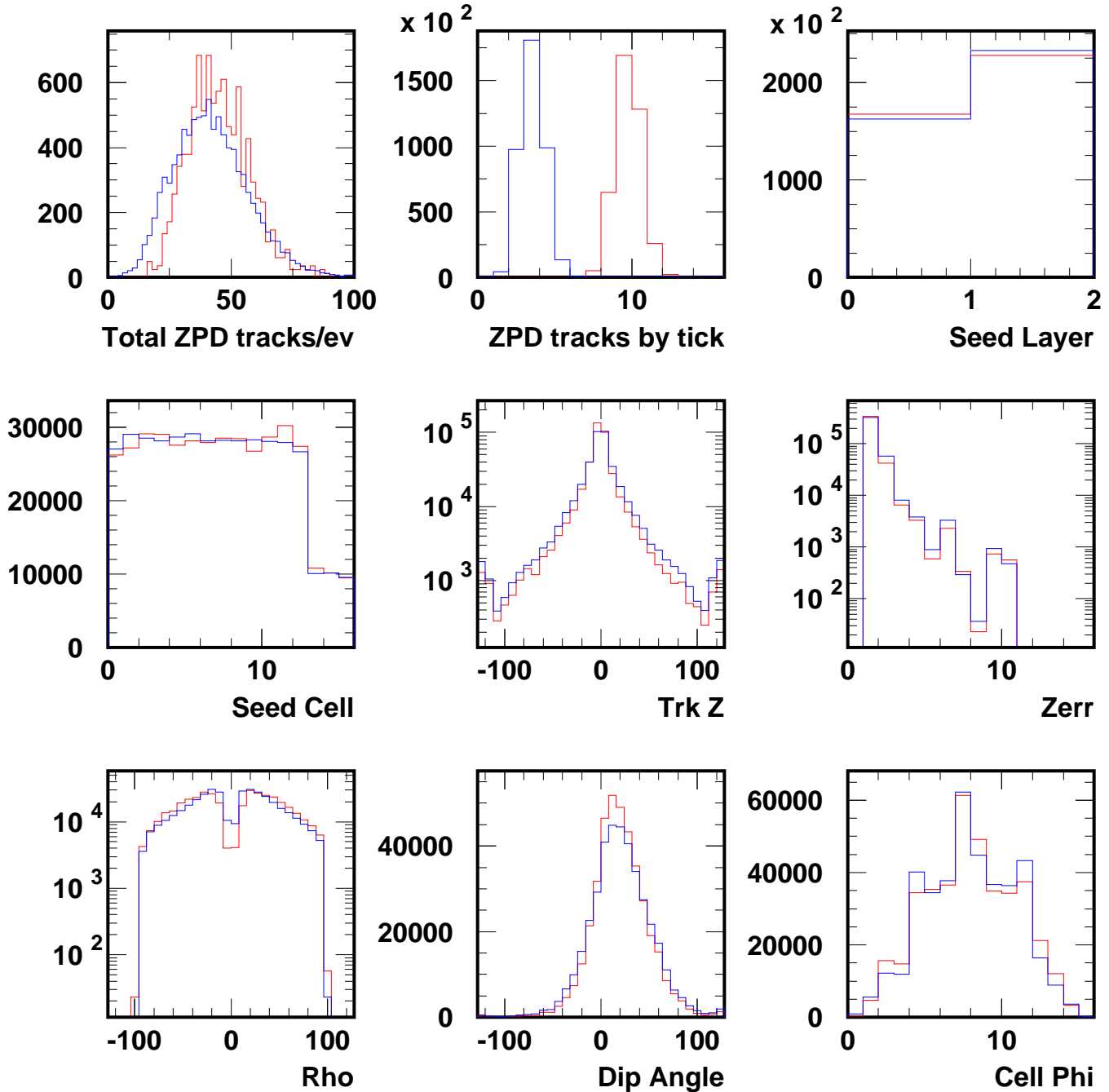


ZPD BBbar Tracks



r54505-L1Sim BBbar

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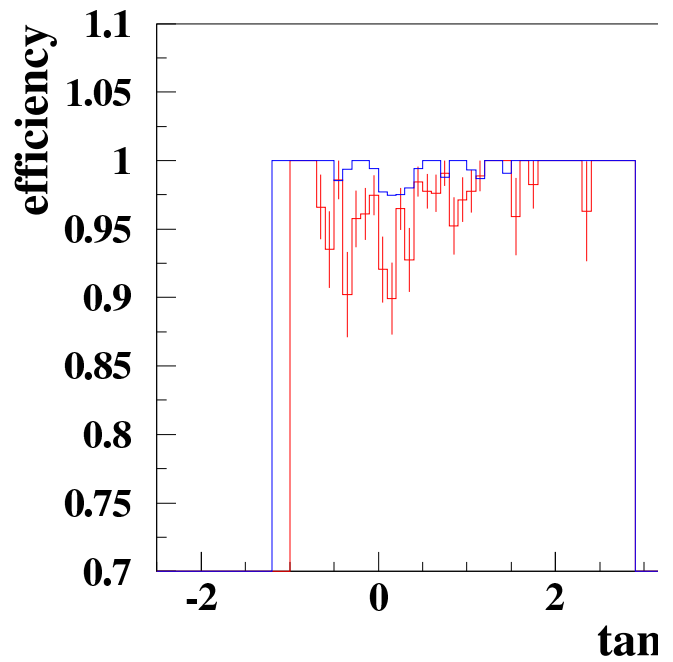
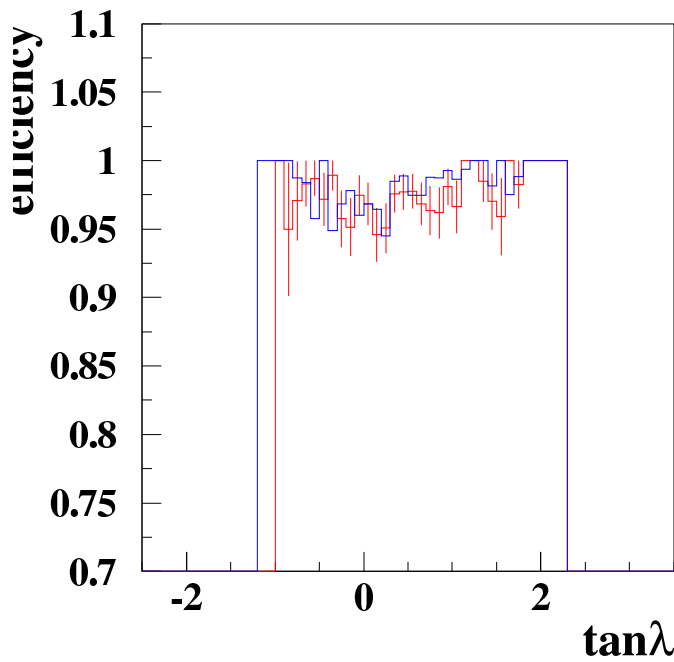
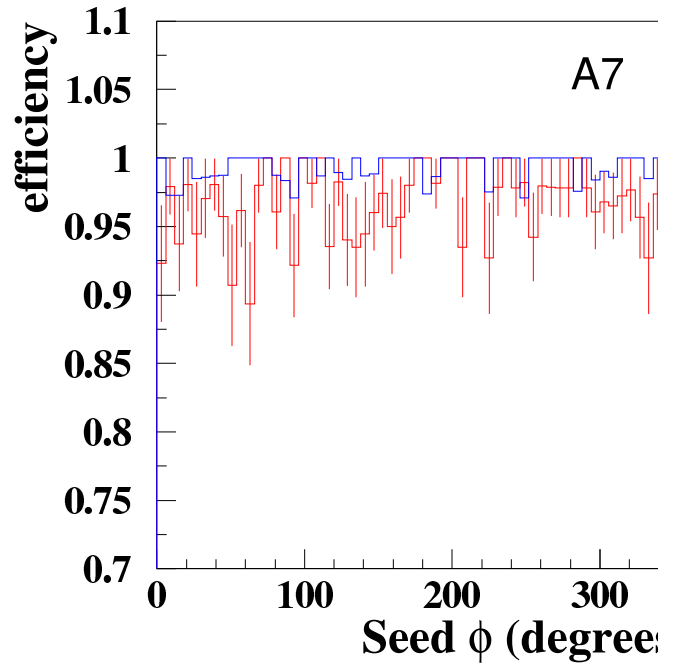
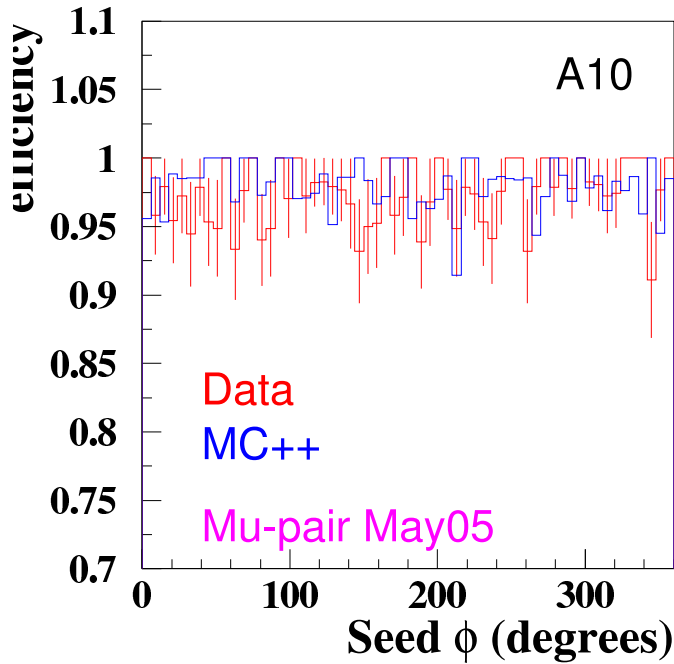
r54505 vs newSim



ZPD Track Efficiency



ZPD track efficiency



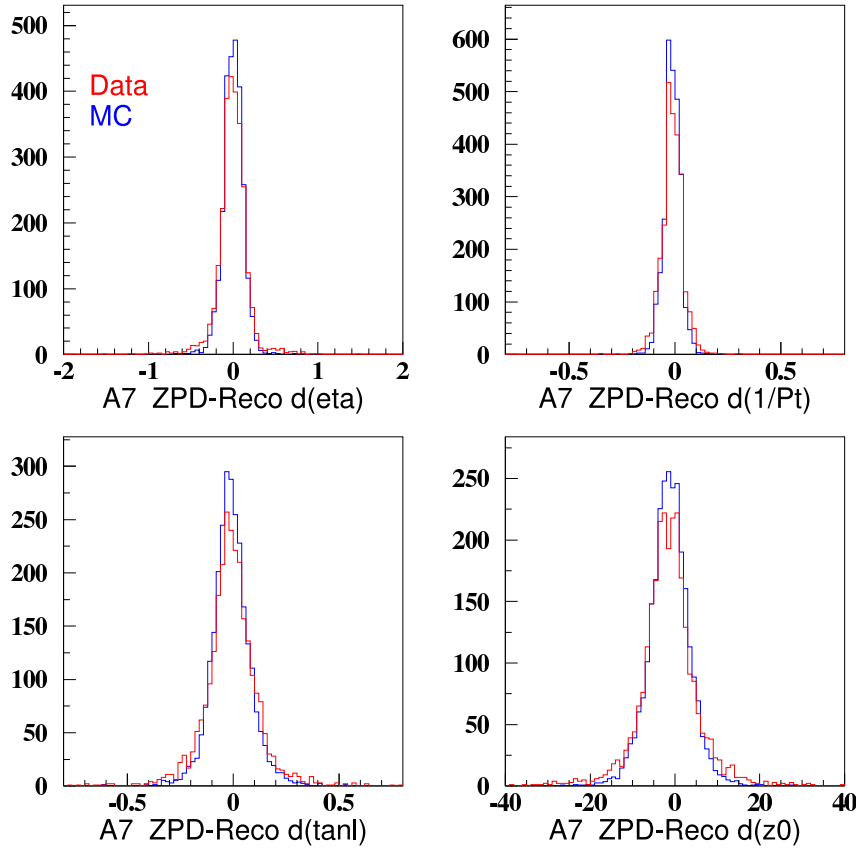


ZPD Track Resolution



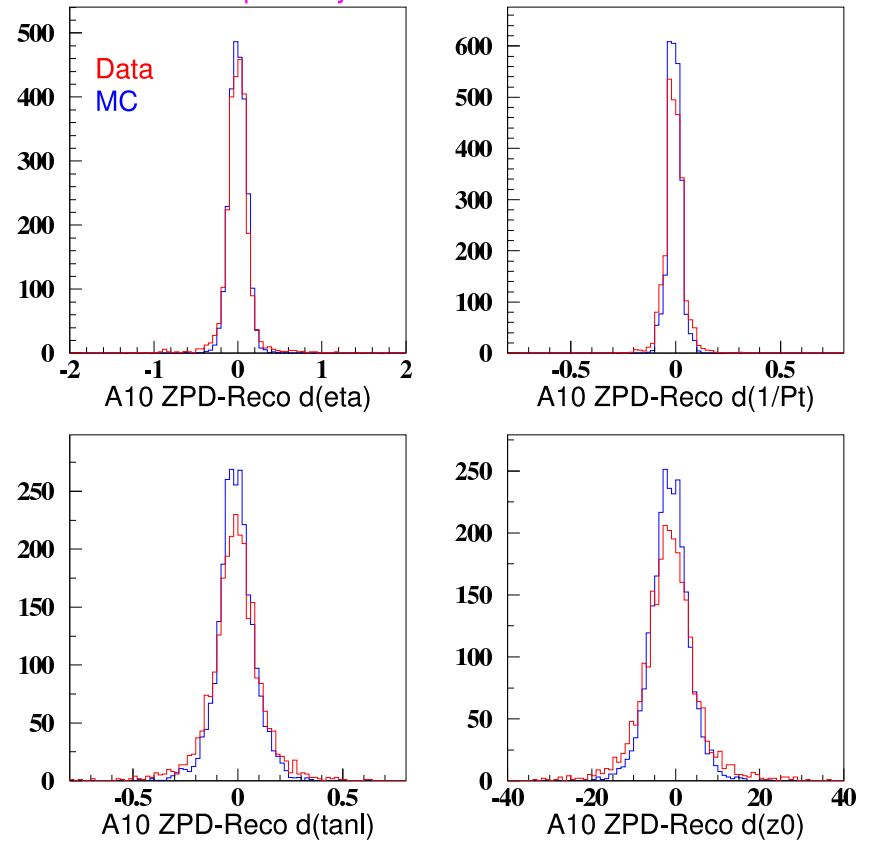
ZPD-Reco track difference

Mu-pair May/05



ZPD-Reco track difference

Mu-pair May/05





ZPD Simulation Status



Arguably the most reliable simulation
Close connection between hardware and simulation

Need background samples to make more detailed
data-MC comparisons

Our kumacs/OprMon tools need some cleaning up...