
Software Report

S. Margetis

Outline

- Status since tracking meeting at LBL
- Critical issues - priorities
- Software plans for next quarter – CDR/CD1

Status since Tracking/HLT meeting at LBL

- **Tracking workshop**

- Full simulations with UPGR15 Geometry finally worked!
 - Still works -> stable environment -> Fast-MC phase-out but re-incarnation possible
 - It served us well in answering the CD0 questions
- We did clarify the important question on tracking/D0 efficiency plus many more things
 - For for the right configuration
 - The official tracker code and
 - The correct errors in detectors
- Level of confidence/transparency increased
- Just in time to do CD0-response work

Status since Tracking/HLT meeting at LBL (II)

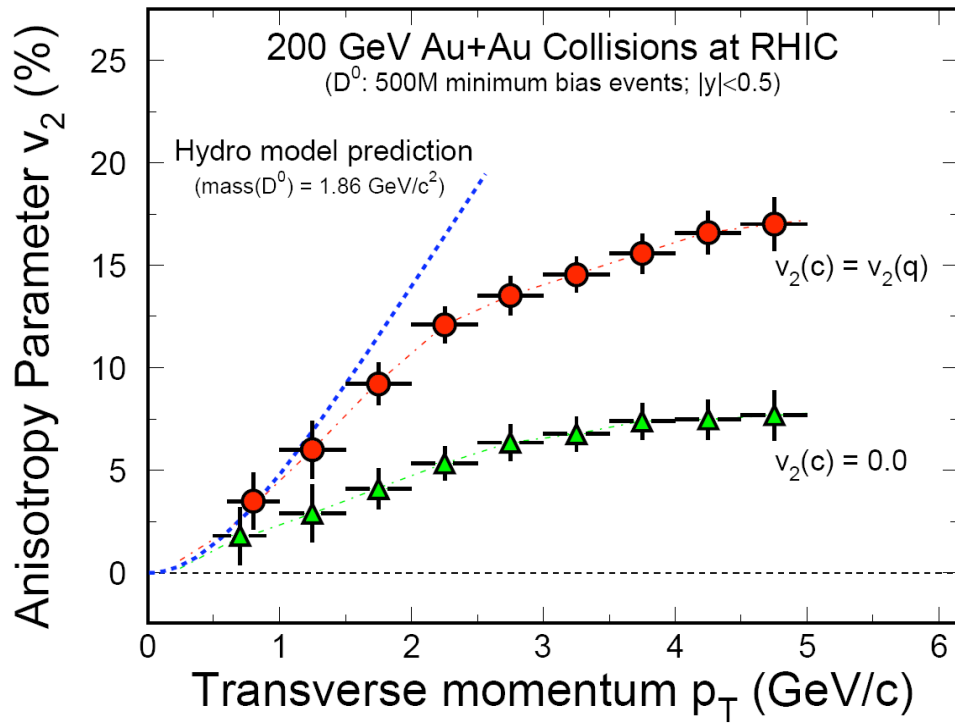
- **CD0 response work**

- We managed to run two [thin/thinner PIXEL] major (~10K Hijing) productions (twice each!) in about about 2 months plus several small ones to target specific questions.
- For every question we got a double answer (one from Fast-MC, one from Full GEANT simulations)

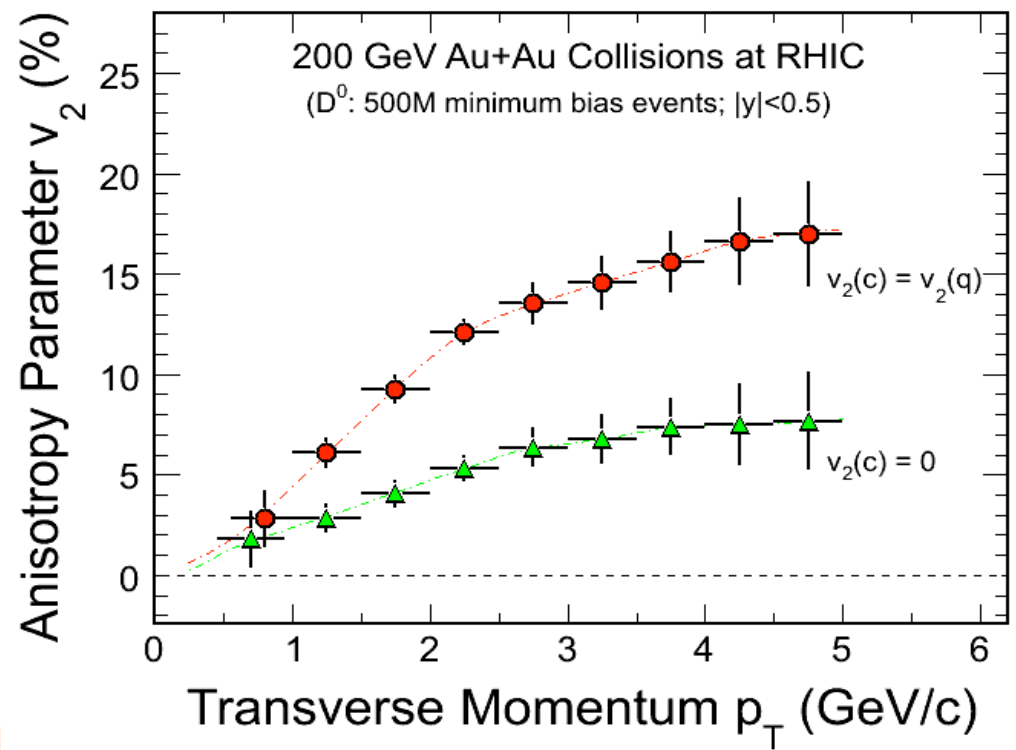
During this exercise we have learned a few things ourselves

Critical issues - priorities

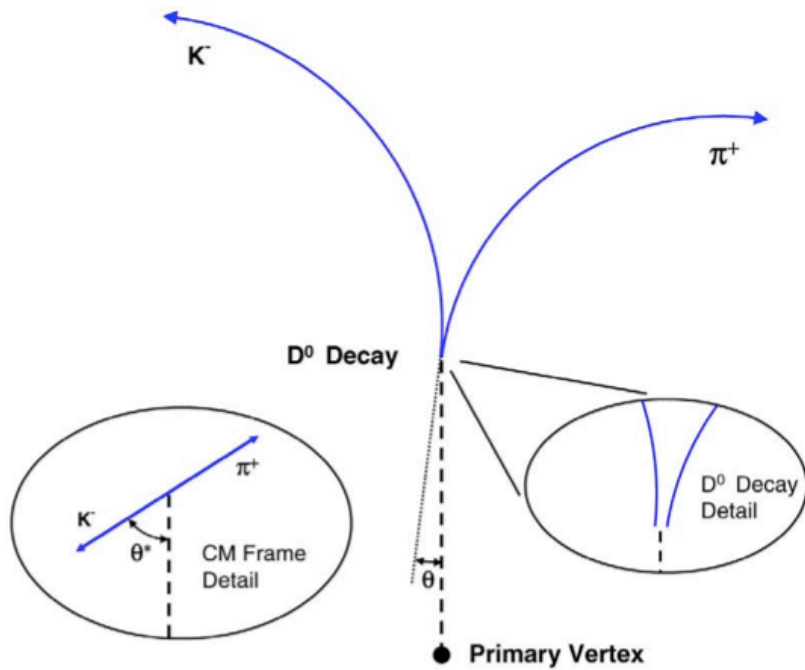
- **CD0 response work**
 - The physics plots turned out different from CD0 review
 - Different errors -> revised analysis
 - We need to have “double shifts” doing the analysis, independently
 - We need more ‘alignment’ with standard STAR analyses, better documentation/code validation
 - CUTS: This piece of code is next to touch and evolve.
 - Deploy momentum dependent code
 - Initially in parallel to validate/compare



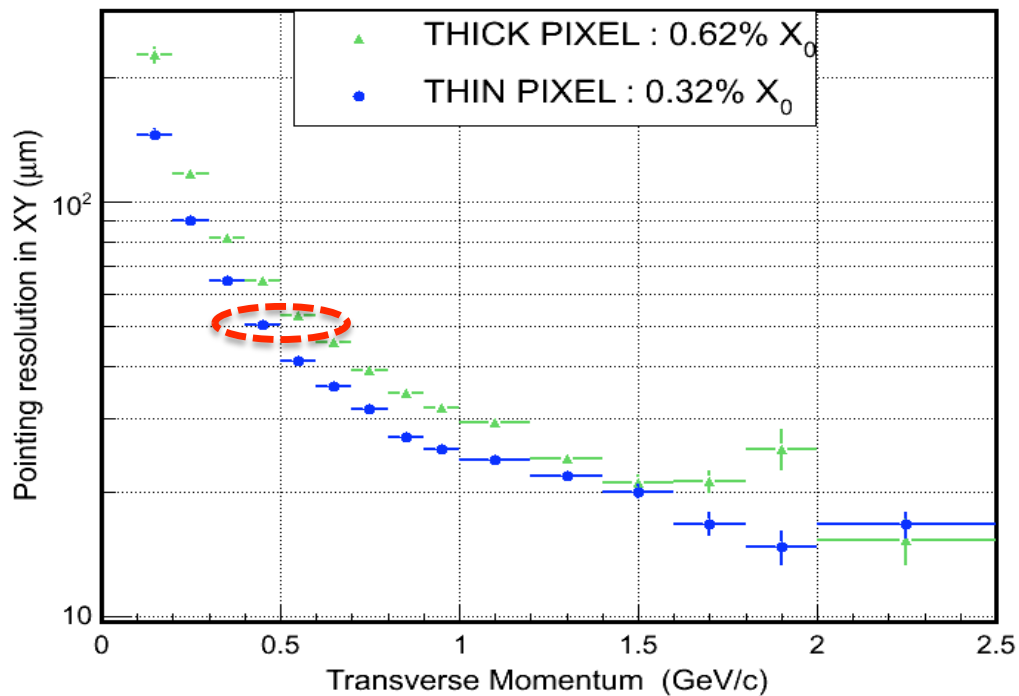
CD0-review



CD0-Response



Cuts	D^0
TPC hits	> 15
Pseudo-rapidity range	± 1.0
PIXEL hits	2
DCA (primary vertex)	$\geq 50 \mu\text{m}$
$\text{DCA}_{\pi\text{K}}$	$\leq 50 \mu\text{m}$
$\cos(\theta)$	≥ 0.98
Δm	$\leq 35 \text{ MeV}/c^2$



Fixed cuts on a steep (log) pt slope are not optimal

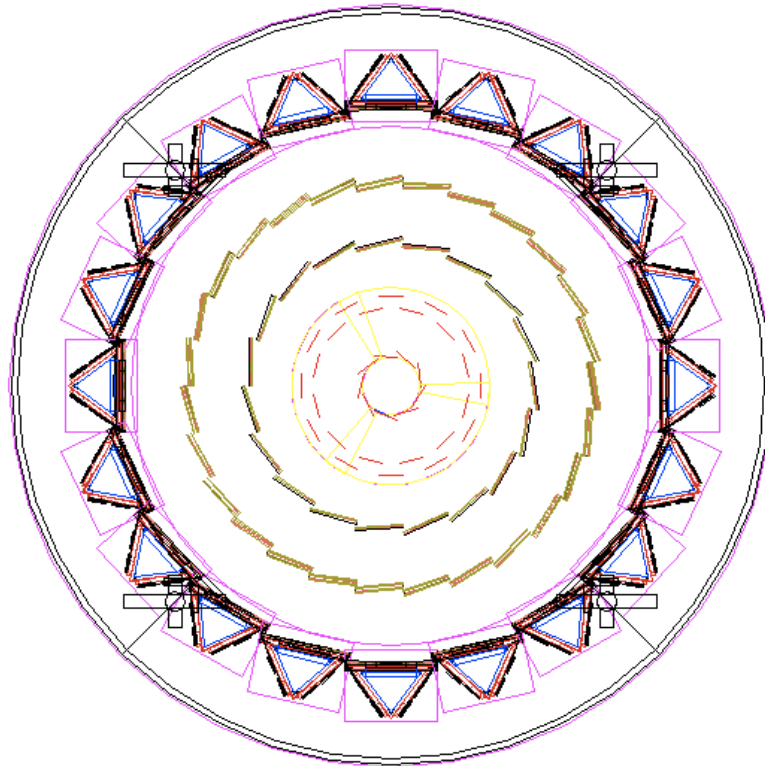
Cut on 1,2,3 sigmas makes more sense. It will improve high pt errors!

Critical issues - priorities

- **Geometry:** GEANT/VMC and all that
 - UPGR15 is working for us now but not for long
 - There are two possibilities to discuss
 - Do incremental but major upgrades....and pay the price
 - Do small updates in the meantime until VMC for STAR is available (we can even help its testing/implementation). This has important (positive) implications in a HFT/FGT integration
 - VMC is high priority of BNL soft infra group.

From UPGR13 to UPGR15

HIGZ_01 @ rcas6012.rcf.bnl.gov



PIXEL : 2 layers :

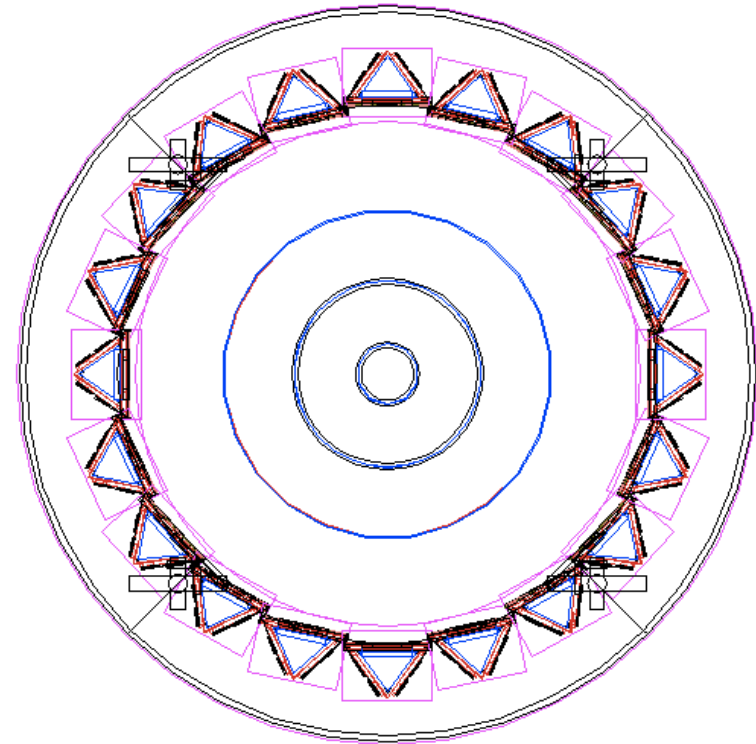
$r_1 = 2.5$ cm 9 ladders

$r_2 = 7$ cm 24 ladders

IST : 2 layers

$r_1 = 12.0$ cm 19 ladders

$r_2 = 17.0$ cm 27 ladders



PIXEL : 2 layers :

$r_1 = 2.5$ cm 10 ladders

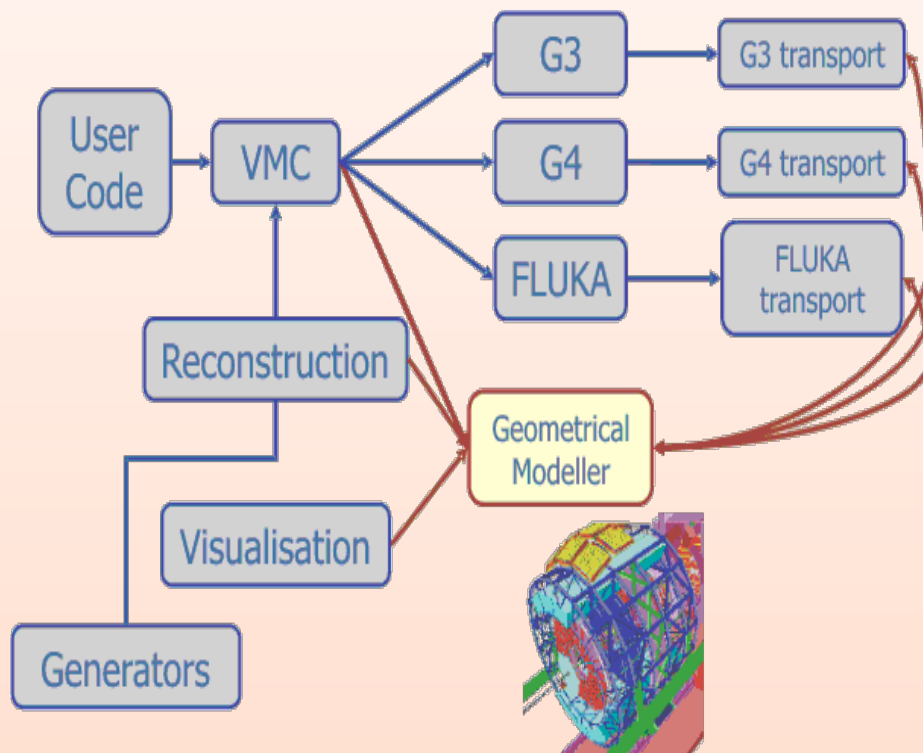
$r_2 = 8$ cm 30 ladders

IST : 1 layer

$r_1 = 14.0$ cm 24 ladders

What is VMC?

- It is a ROOT 'package'
- Used in ALICE
- We have partial use of it now



For US:

- Will provide unified environment
- Will provide GEANE-like capabilities with full Kalman
- Can do tracking in non-uniform B, FGT !!
- Can be used to introduce misalignments in MC

CDR/CD1 plans

- We do have D^+ , D_s and Λ_c particle embedded in our 10K production
 - Jonathan started on D^+ . Prague is interested too
 - UCLA expressed interest for the D_s
 - Λ_c have to be done in UPGR15 for the CDR/CD1
 - B-meson work is not clear to me right now

Longer term software plans (based on RMP tasks)

FY2009 Milestones

Q3 FY 09	Complete simulations for CD0 homework
Q4 FY 09	Complete CD1 simulations
Q4 FY 09	Concept for spatial calibration of Pixel
Q4 FY 09	IST detector response simulator implemented

FY2010 Milestones

Q2 FY 10	Concept for HFT Calibration
Q2 FY 10	IST pre-prototype module cosmic ray test, calibrated and analyzed
Q2 FY 10	Pad Monitor functioning
Q2 FY 10	Calibrate Pixel prototype
Q4 FY 10	Cosmic ray test of engineering prototype done and analyzed
Q4 FY 10	Update geometry in simulations

END