

***Integrated Tracker
(progress, status, plans)***

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December Status

- 1 **Claude Pruneau in his December report gave** (<http://www.star.bnl.gov/STAR/comp/meet/AM200411/StarMeetDec4-04.ppt>) **history, overview of problems and status of Integrated Tracker. He concluded with following actions list:**
- **“ ...Code review + some further bug fixes in progress ...**
 - **Further performance checks ...**
 - **Is the SVT geometry OK, or Sti problem only?**
 - **Some tuning - insure tracking parameters are optimal**
 - **Large scale test and review (again?) “**

Summary of the Progress for last three months

- **Major players in code review, debugging and tests are: Victor, Claude, Manuel, Marco, +Andrew**
- **Some principal changes have been made (list of changes on next slides)**
- **Bugs have been found and fixed**
- **This step has been complete last week**
- **IT gets better but we still don't know: Is it good enough ?**

Principle Changes

1. To reduce correlation with **Curv** variable
 $\text{eta} = X_c * \text{Curv} = -\sin(\text{Psi}) + x * \text{Curv}$
has been replace by
 $\text{eta} = -\sin(\text{Psi})$
2. To keep sign of **cos(alpha)** (where **alpha** is track direction in local system) new argument **fitDirection** was added to a lot of methods.
3. In many places it was a mess between **NormalRefAngle** and **LayerAngle**.
4. Each node now is initiated with infinite **chi2** and changed only if fit is successful. This blocks penetrating garbage to track parameters.

Principle Changes (cont.)

- 5. In refit covariance matrix has been reset.**
- 6. Alice propagation formula has been corrected for big angles.**
- 7. Added debugging tools on different levels:**
 - Added numerical verification of derivative matrices.
 - Added verification of all matrix manipulation.
- 8. Added dead material (mainly for SVT) using Virtual Monte Carlo geometry.**

Modification required (next step)

- 1 The main limitation in IT now is the geometry model:
 - It is essentially 2D + 1 geometry which is the first of all suited for ideal TPC (Global to Local coordinate transformation => rotation around Z)
 - This creates troubles with alignment and including new detectors.
- 1 The solution is to use VMC geometry.

The concern was that VMC could affect performance. There is proof (from Victor's test) that this is not the case. VMC is a factor of ~3 faster in geometrical node search with respect to Sti tracking.

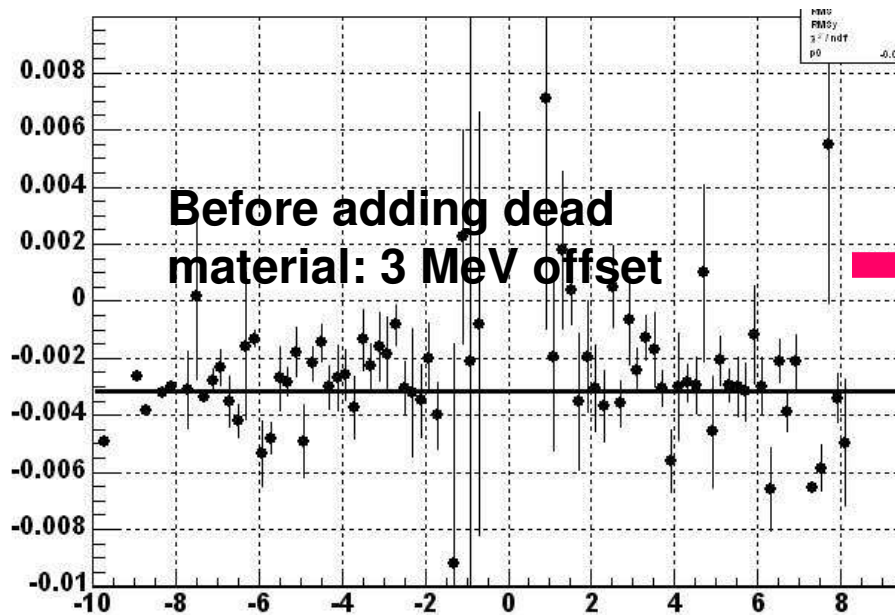
Status

- 1 After all above there are certain improvements, especially for tracks with no. of TPC points > 15 but
- 1 The overall status of IT is still unclear.
- 1 Test production has been run (“no SVT” runs are still in processing)
- 1 We have not finished evaluation yet..
- 1 More news later

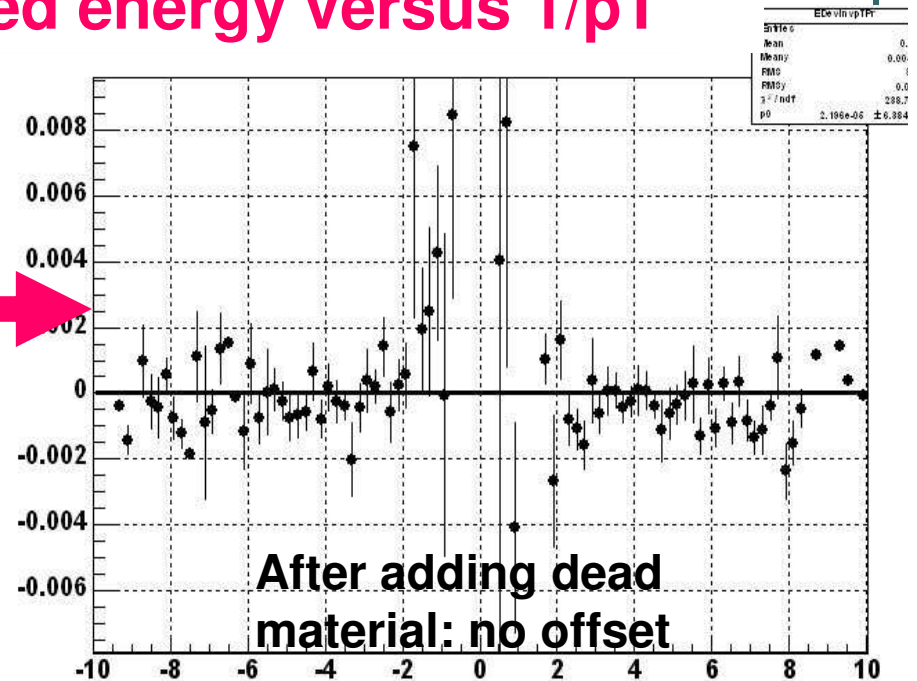
Dead material

After adding dead material there is no more offset in energy measurement seen before

EDev1 **Reconstructed - Simulated energy versus $1/pT$**



Tue Feb 22 14:05:19 2005



Tue Feb 22 14:09:22 2005

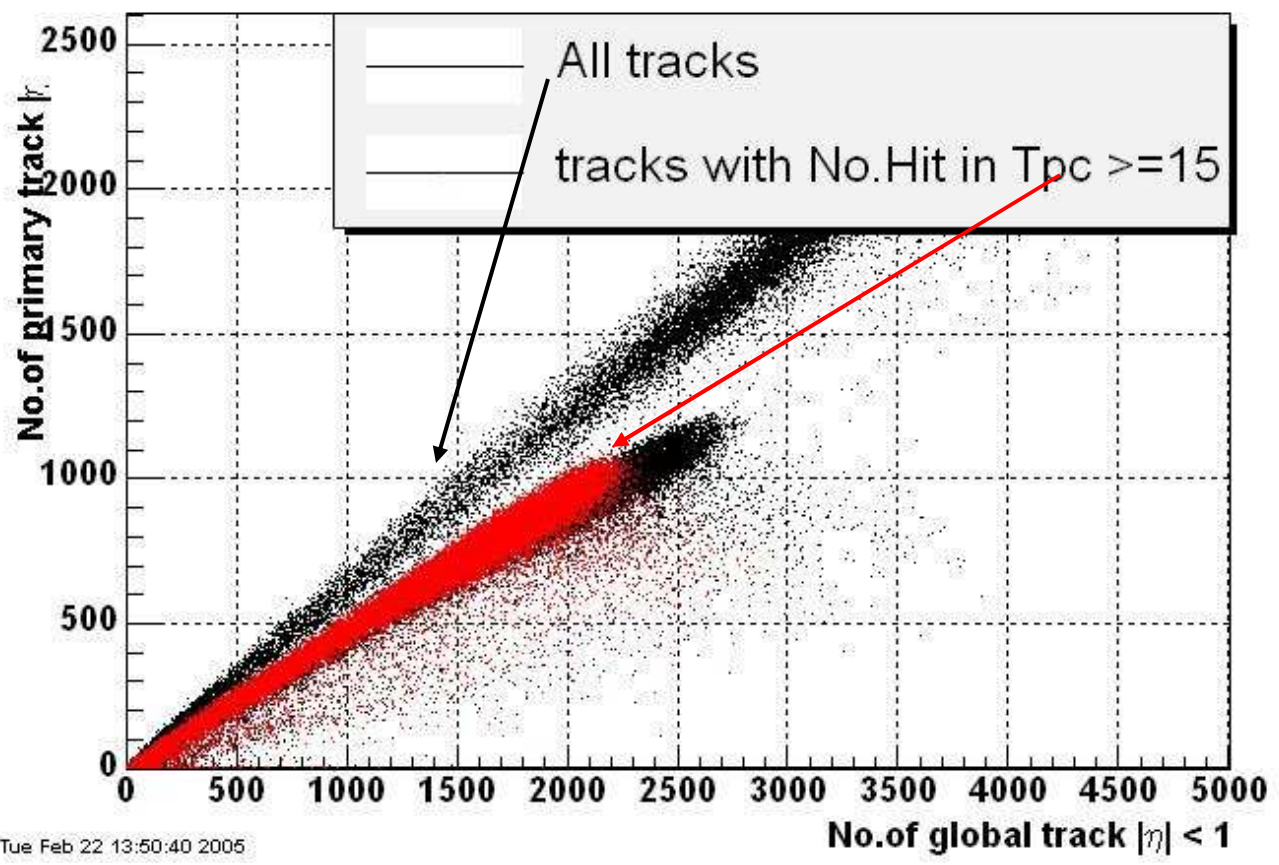
SVT matching

Possible/ found hits

| | 0 | 1 | 2 | 3 | 4 |
|---|-------|-------|-------|-------|------------|
| 0 | 1.000 | | | | |
| 1 | 0.163 | 0.837 | | | eff. ~ 70% |
| 2 | 0.063 | 0.483 | 0.453 | | |
| 3 | 0.041 | 0.221 | 0.329 | 0.409 | |
| 4 | 0.034 | 0.208 | 0.243 | 0.456 | 0.059 |

No. of Primaries versus no. of Globals

no. of primary vs global



Two band shape is due to tracks with No.TPC hit points < 15

Plans

- 1 Evaluation of present IT with test productions (with and without SVT)
 - Performance with respect to tpt
 - Possible IT parameters tuning
 - Bring IT to level of PWG evaluation by **April 1, 2005.**
- 1 Check possibility to use VMC
 - Proof of principle (very tentatively) by **April 1, 2005**
- 1 **By August 1, 2005**
 - Add Smoother (IT hit self consistency check)
- 1 Primary vertex fit has to be revisited to use track parameters errors, multiple primary vertex option.
- 1 Alignment
- 1 New detectors