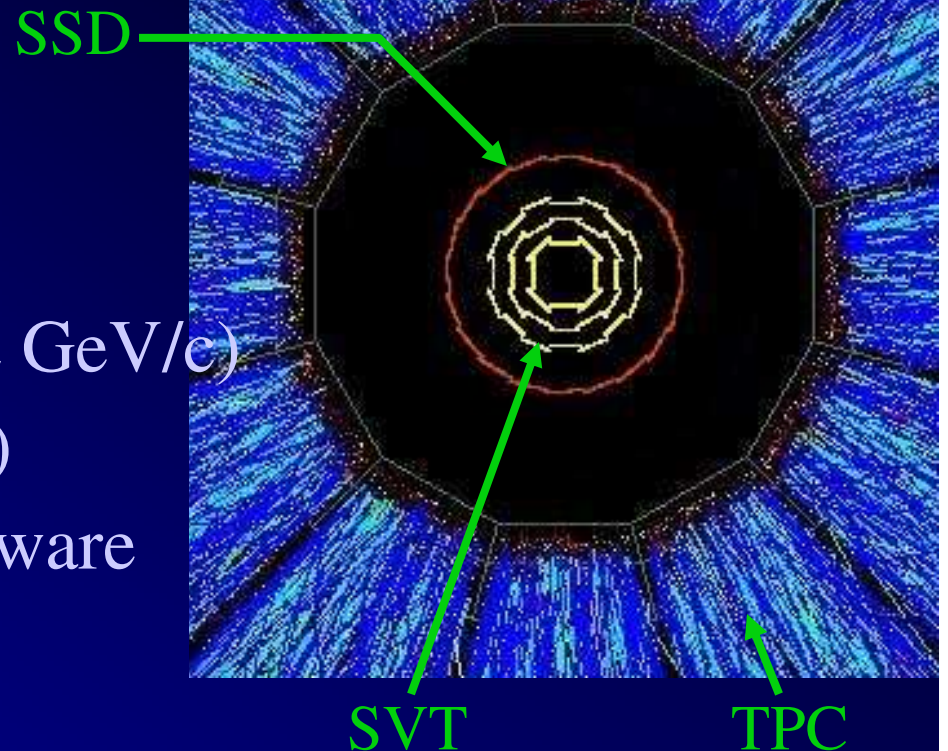


# *SSD status and Plans for Year 5*

Lilian Martin - SUBATECH  
STAR Collaboration Meeting  
BNL - February 2005

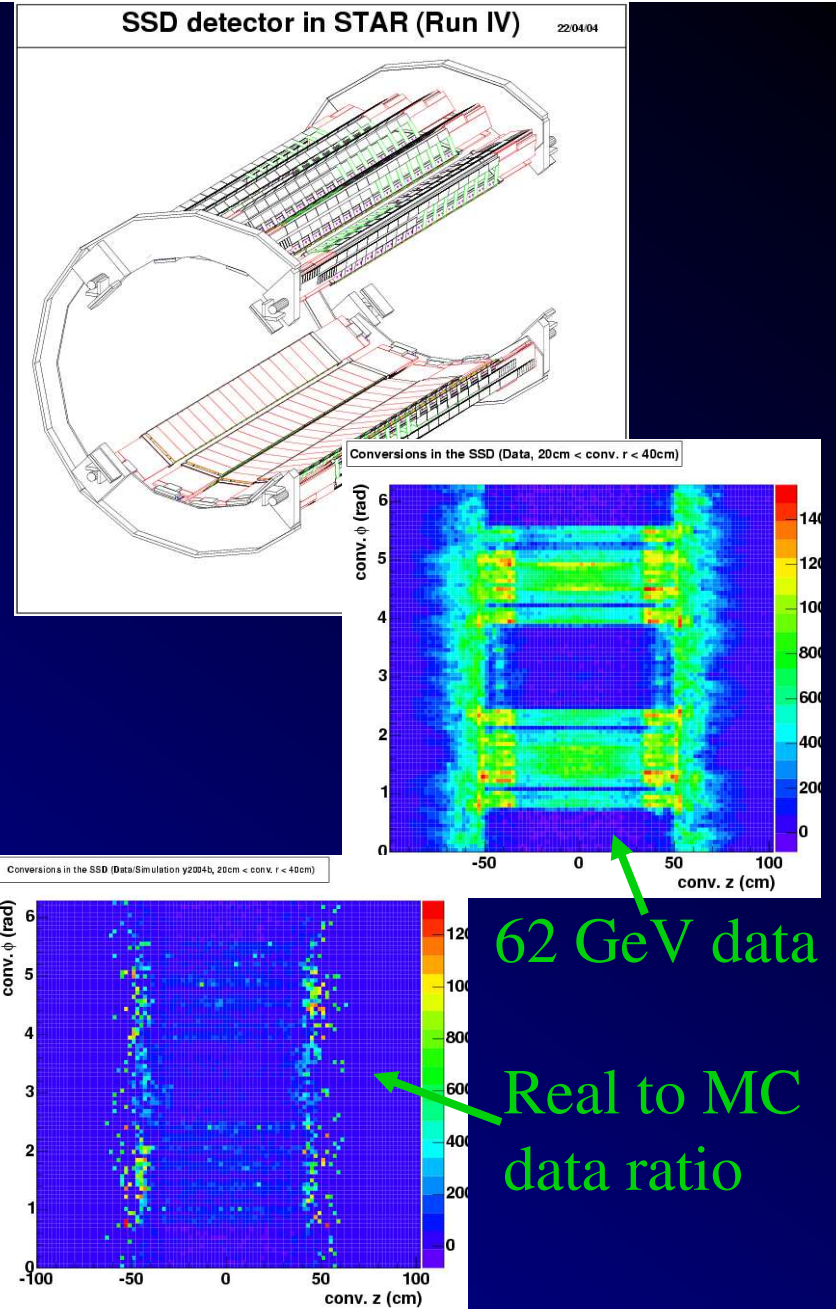
# *SSD in STAR*

- 10 ladders in 2004  
(Au+Au @ 200 GeV/c and 62 GeV/c)
- 20 ladders in 2005 (Cu+Cu)
- SSD analysis tools and software
  - Simulation
  - Hit reconstruction
  - Tracking
  - Alignment
  - Calibration
- More results in the SSD status report next Saturday (Joerg Reinnarth)



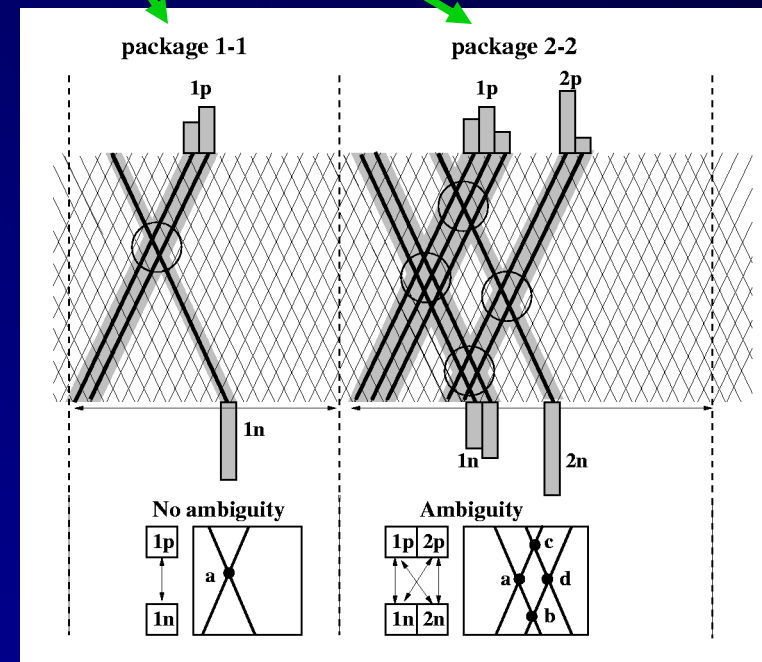
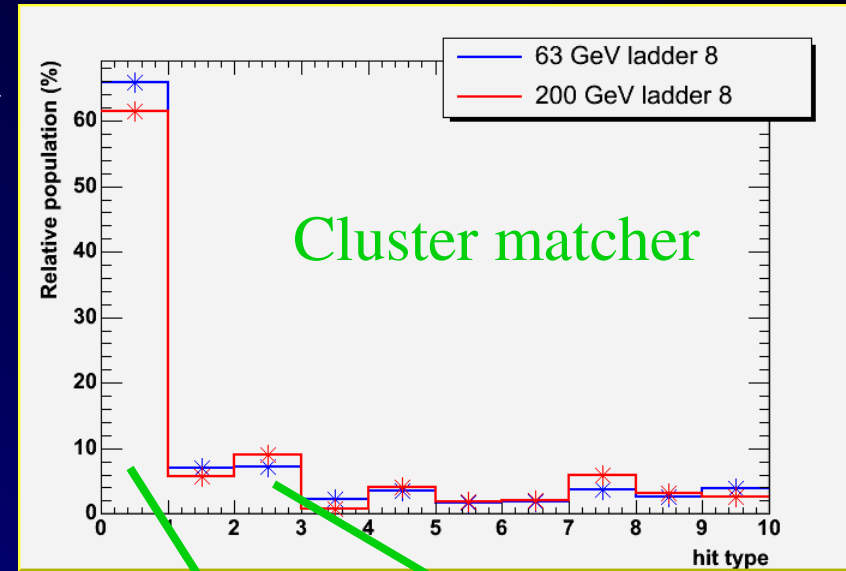
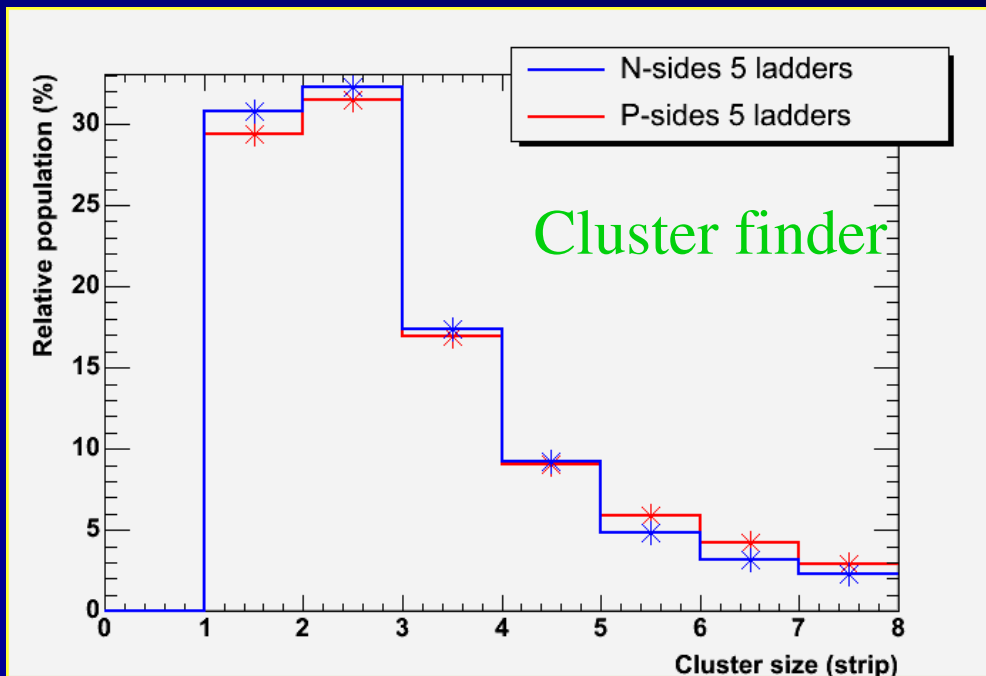
# Simulations

- Sisdgeo.g : SSD geometry in GEANT
  - We will update the geometry for Run V (different ladder support)
  - New iteration on the material budget (disagreement between the simulation and data photo-conversion yields)
- StSsdSimulationMaker : SSD simulation chain
  - The code exists but must be revisited and updated (assumes a given noise level, fraction of bad strips,...)



Plots stolen from the analysis of Alexander Wetsler

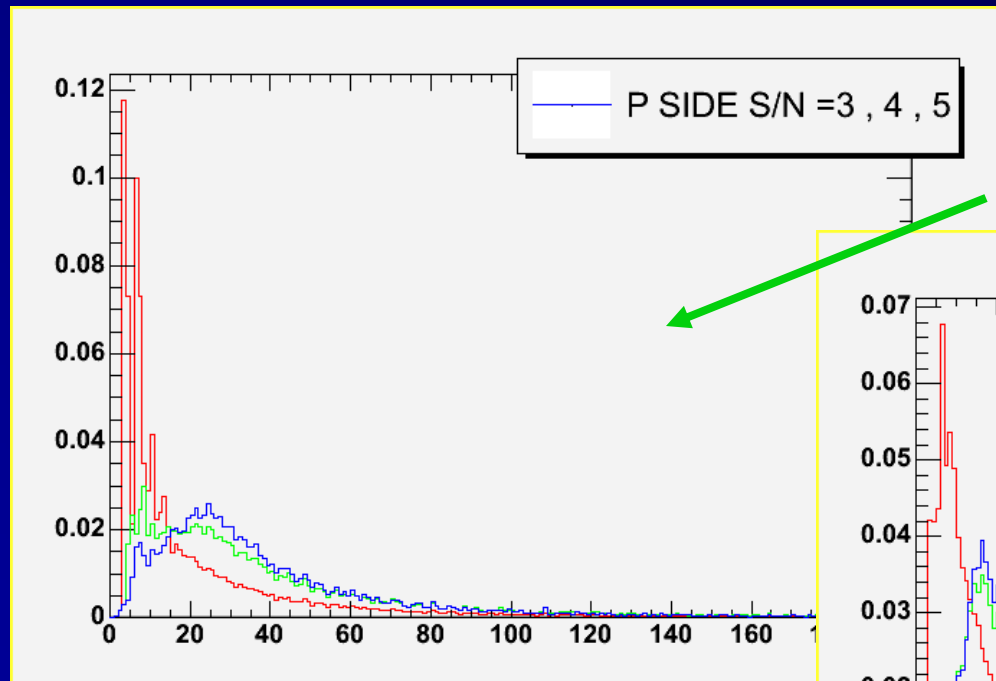
# Hit Reconstruction



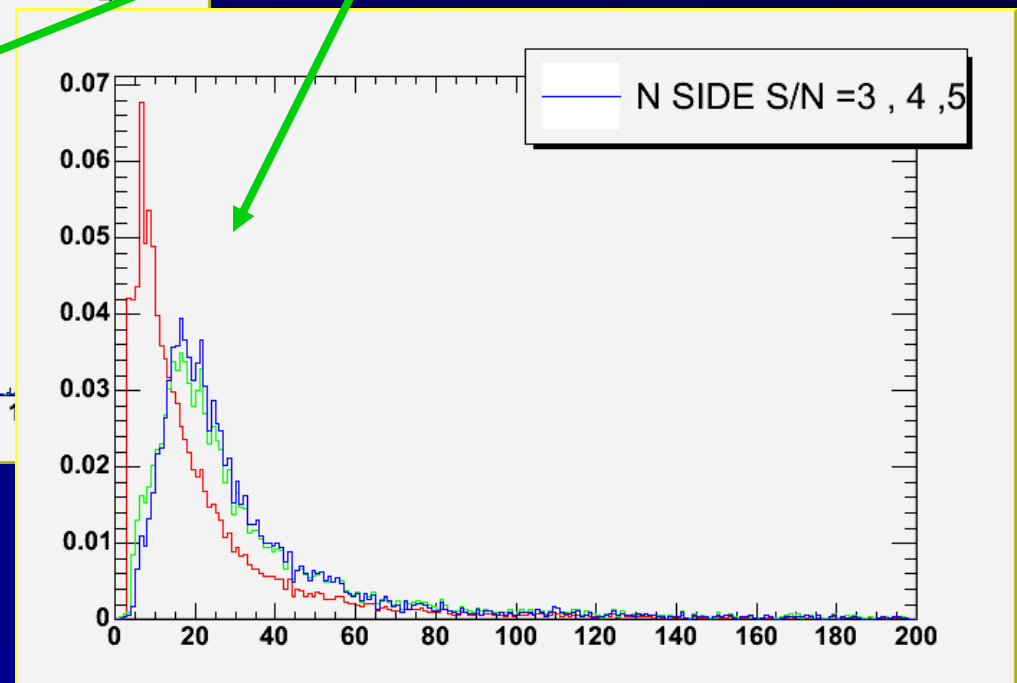
⇒ Cluster size distributions are good.  
 The tail is induced by the noise  
 ⇒ Hits are essentially of type 1-1  
 (hit density is small)

# Hit Reconstruction

Signal/Noise ratios



P and N sides distributions for various cuts on the central strip



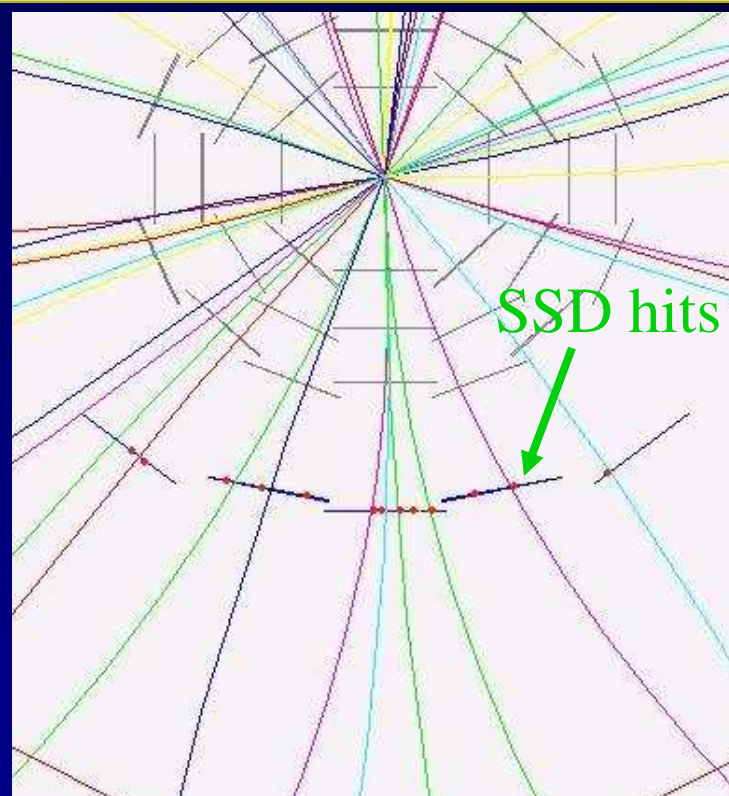
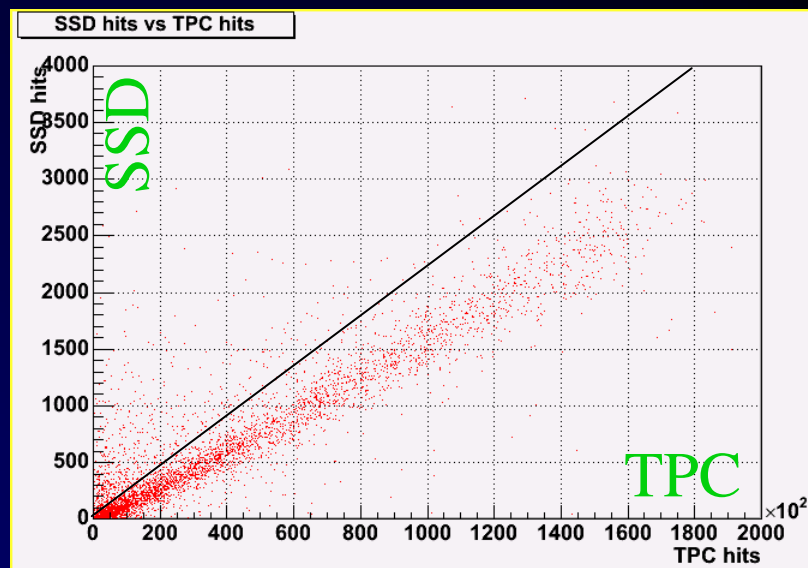
⇒ S/N slightly better for the P sides (smaller noise)

# *Hit Reconstruction*

- StSsdDaqReader not in cvs yet :
  - Written by Herb Ward, ready and almost reviewed
  - Ready for run V data (same data format)
- StSsdPointMaker : cluster finder/matcher
  - code ready for a perfect detector
  - must deal with specific (mostly run IV) effects :
    - CMS noise, pedestal offset variation, dead strips
    - Large clusters which bias the total charge and position
    - Increase the ambiguous hit population
  - Will develop a light version for the Fast Offline QA (urgent)

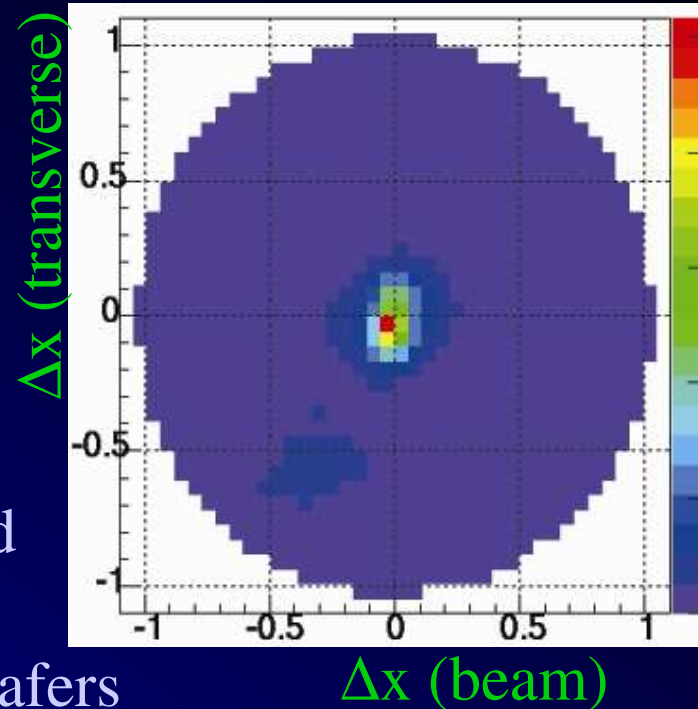
# Tracking

- SSD hits loaded in StEvent
  - Clear correlation between the numbers of SSD hits and TPC hits / primary tracks / global tracks
- SSD nominal geometry included in Sti
- Tracking from the TPC into the SSD working :
  - Fraction of the hits associated during a tracking test
  - We should propagate the real geometry
  - We will tune the tracking parameters.



# Alignment

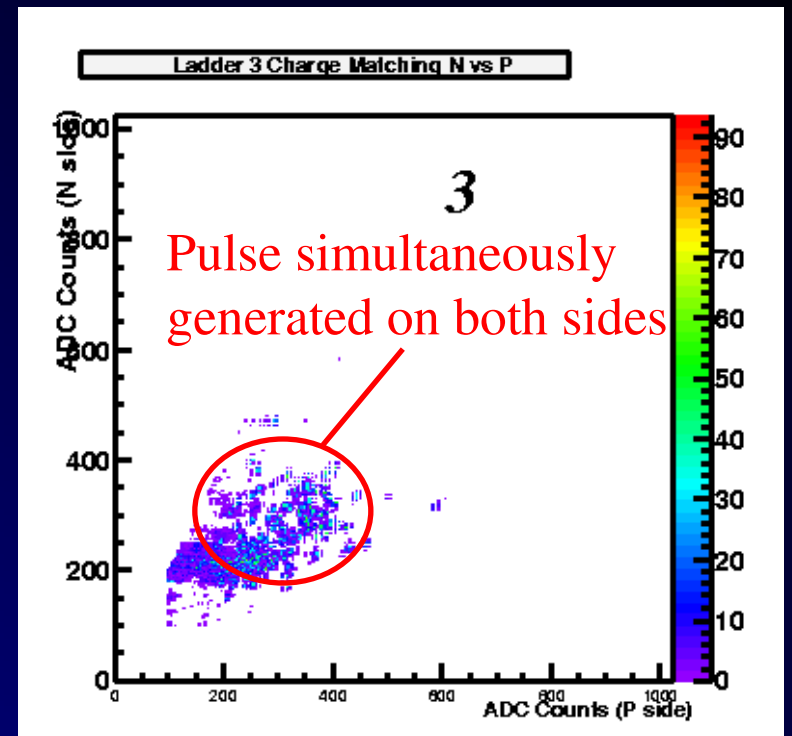
- Analysis started on real run IV data
  - based on the SVT methods
  - primary tracks (after ITTF in TPC) and SSD hits from StEvent.
  - projections of the tracks on the SSD wafers
  - Residual minimization by varying the wafer positions
- Cleaning up the SSD data while the analysis is progressing.
- Must break the geometry into SSD/sectors/ladders/wafers components to disentangle the effects :
  - The calibration tables exist
  - Cross check with the ladder assembly db and the survey data





# Calibration

- Will do a relative gain calibration for Run V data.
  - Important for the cluster matching high order hit types
  - Calibration with real data is difficult and need statistics.
  - Calibration on a chip basis (pulses on few strips only at several amplitudes).
  - Slow control ready for pulser runs
  - Will provide a dead/noisy strip map
- Need a run at B=0 for the alignment
  - Must check the SSD is ON when the data will be taken



# QA

- Must assess the SSD impact on STAR performances
  - Geant geometry versus real radiation length
  - Hit characteristics (cluster size, charge ratio, relative population of hits)
  - Ladder/wafer hit efficiency and purity
  - Position and  $dE/dx$  resolutions
  - Improvement on the tracking in the SVT
  - Improvement on the overall tracking
  - Impact on the secondary particle and vertex reconstruction

## *Plans for the (very) near future*

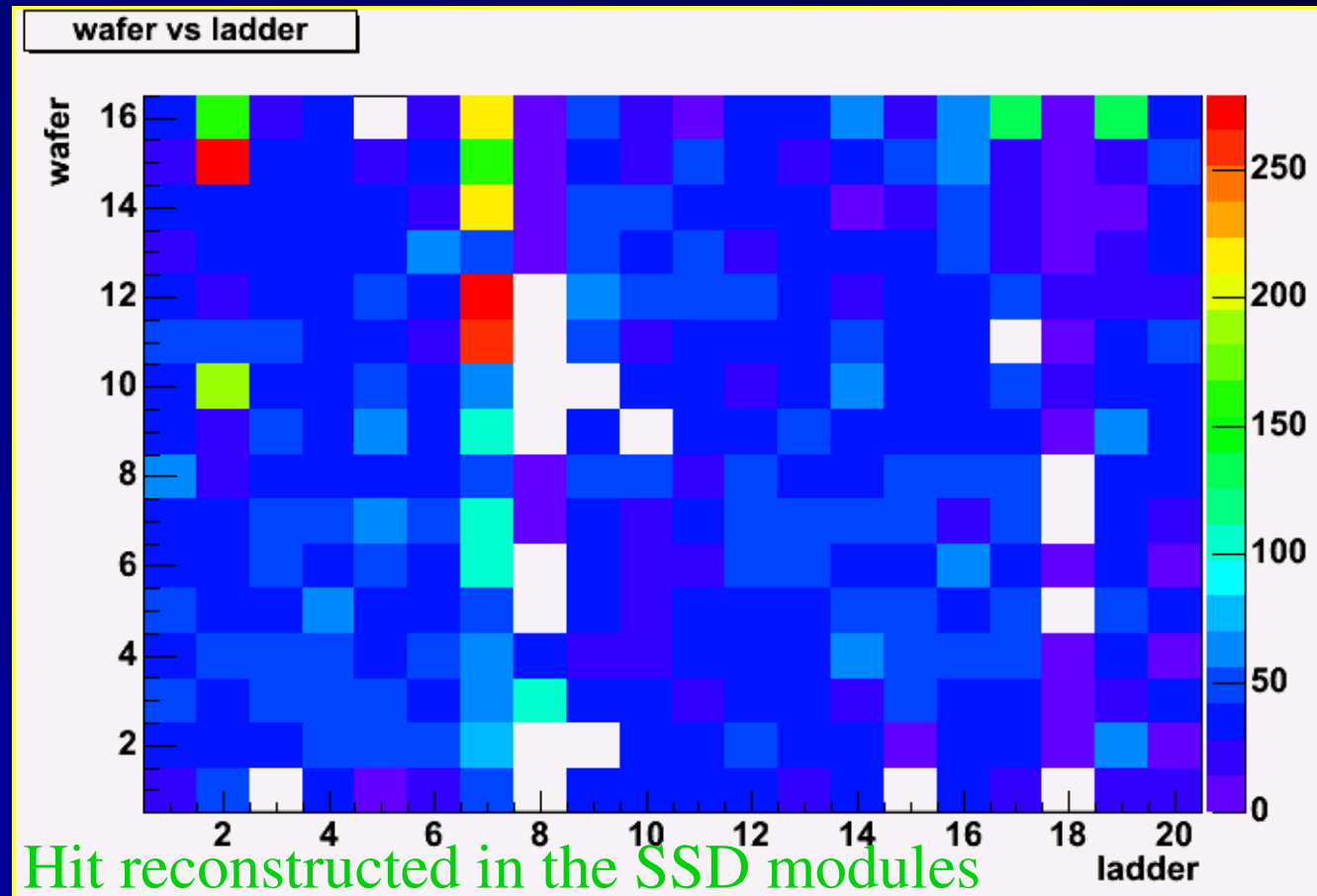
- Strong push to fully integrate the software in the STAR framework and the SSD in the reconstruction chain
- We will focus on the new Cu+Cu data
  - Same direction as the others
  - SSD completed and more stable
- Tasks/Contributors :
  - Gain calibration / Hit reconstruction : Lilian
  - Simulation chain : Christelle
  - Tracking : Boris/Jonathan
  - Alignment : Joerg
  - Fast Offline : Jerome B.

## *Plans for the (very) near future*

- Hit reconstruction with real and simulated data does not depend on the other subsystems.
- Alignment can be performed with real data and MC event before best TPC calibration and B=0 data are available.
- Tracking parameters can be first tuned with simulated data.
- All above must be well advanced by the end of March/early April
- Fast Offline is really urgent : mid March
- Intermediate report in March (Christelle at BNL)
- Small review in April (Jerome L. at SUBATECH)

# *Plans for the (very) near future*

Cu+Cu @ 200 GeV analysis already started





## *Online software*

- Online histograms defined and filled.  
Reference histos exists
- SSD is not Fast Offline yet
  - Need a light version of the StSsdPointMaker
  - Need to define the QA histograms

One online plot