

Development of PISORP code for TOF and first trial of occupancy study with PISA using new Tsukuba farm

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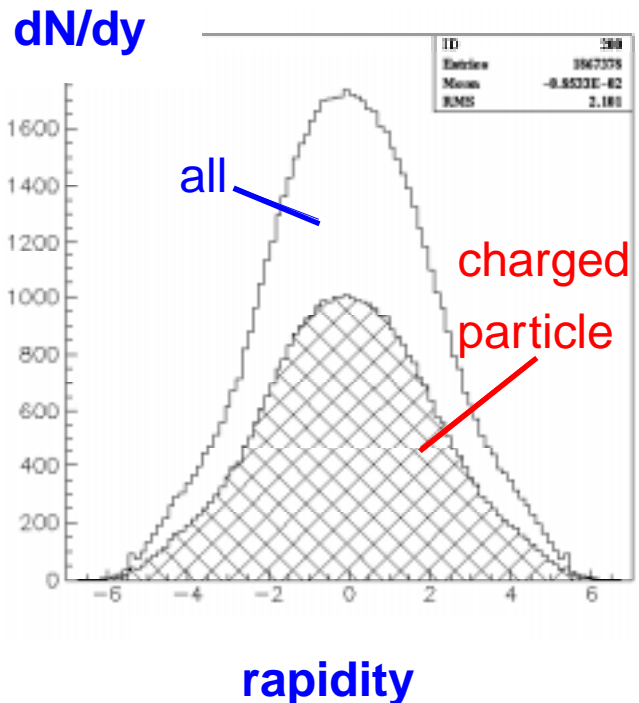
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Setup of Simulation

Event Generator : HIJING
 Central Au + Au 200AGeV
 ($b = 0.0 \sim 1.0$ fm)
 1000 events are generated

$$dN_{ch}/dy \sim 1000$$



PISA :

emission angle cut

$$20^\circ < \theta < 160^\circ$$

(TOF kinematic coverage

$$68^\circ < \theta < 112^\circ$$

$$-66^\circ < \phi < 22^\circ$$

All sub-detectors ON

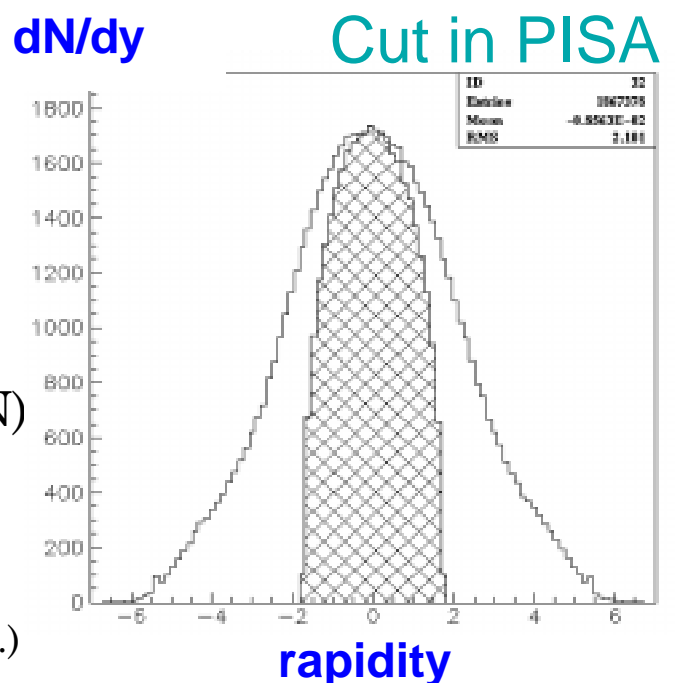
PHYSICS switch

1. OFF (only "LOSS" is ON)

2. ON

threshold : 1MeV

(CUTGAM,CUTELE,CUTHAD,....)



Calculation Time of PISA

using new Tsukuba computer server

PISA simulation for HIJING events with physics on

with Origin2000 (R10000)

1000 events are simulated with PISA in one day!

100 events run take about 28 hours (per CPU)

10 CPUs used

with Indy (R4000)

10 events run take about 16 hours

----> CPU speed is 1/6 of R10000



SGI Origin 2000 (12 CPUs)

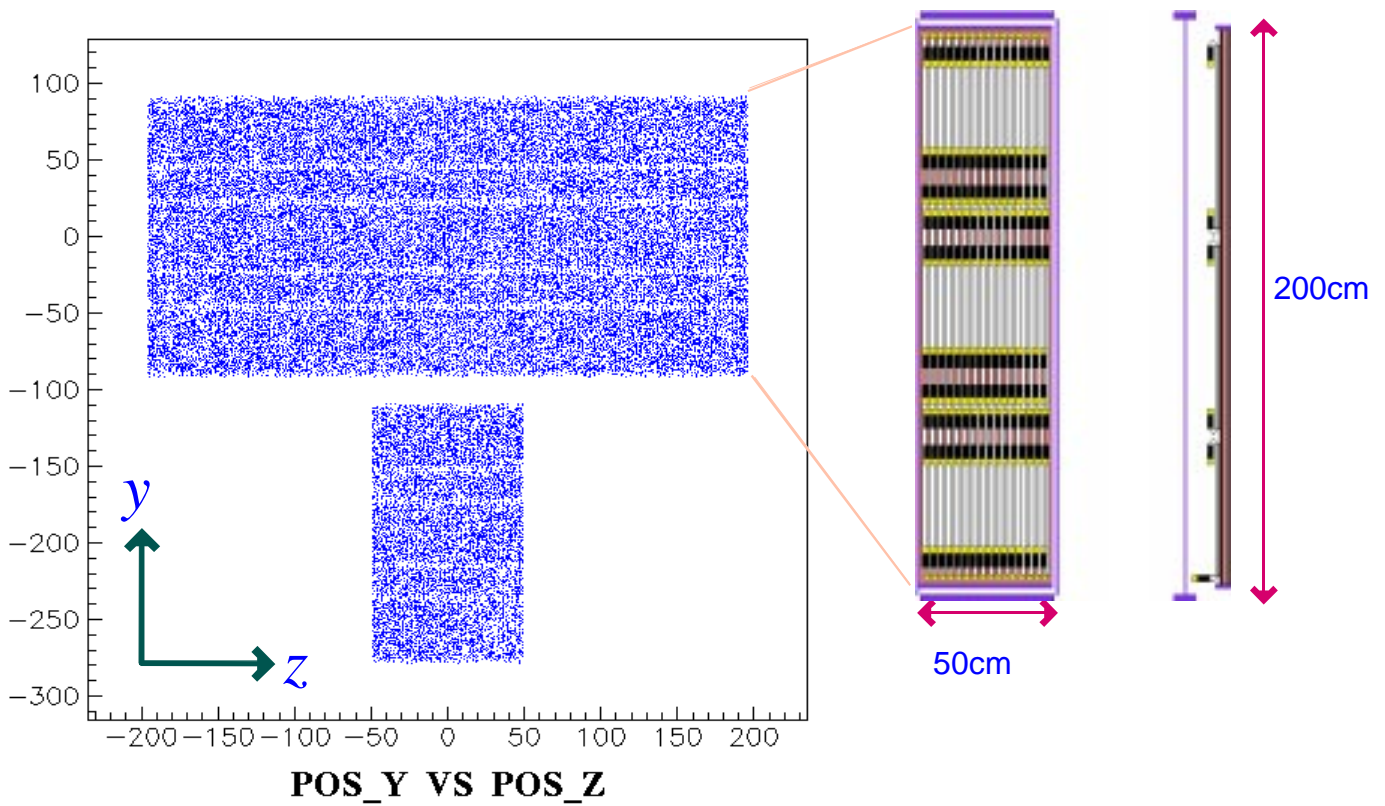
Performance : 102 SPECint95

187 SPECfp95

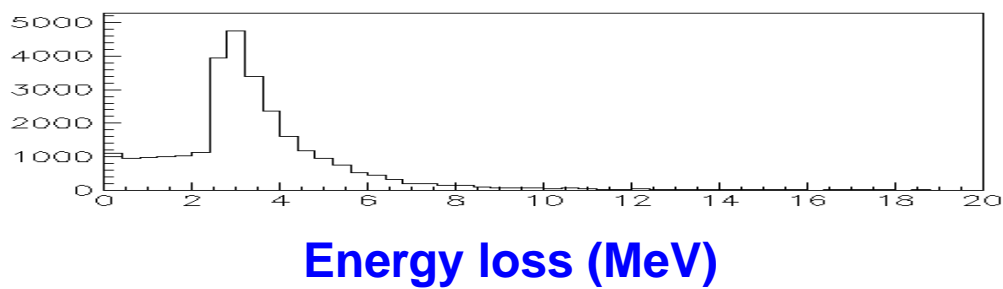
Memory : 2 GB

Disk : 140GB

Check of PISORP-TOF



Hit points at the TOF (see from collision point)



Scintillator is 1.5 cm thick --> Energy loss ~3MeV
(by Min. Ion. particle)

TOF Occupancy

using
PISORP

Definition of Occupancy

$$\text{occupancy} = \frac{\text{No. of hits on TOF}}{\text{No. of TOF slats (=960)}}$$

Original design of TOF , 10 % occupancy at $dN_{\text{ch}}/dy \sim 1500$

In this HIJING event $dN_{\text{ch}}/dy \sim 1000$

Physics off [Primary particles]

of hits ~ 28 /event occupancy 2.9%

Physics on [Primary and Background particles]

of hits ~ 63 /event occupancy 6.5%

of primary particle hits ~ 23 /event

(Primary : vertex point is in MVD [R < 25cm])

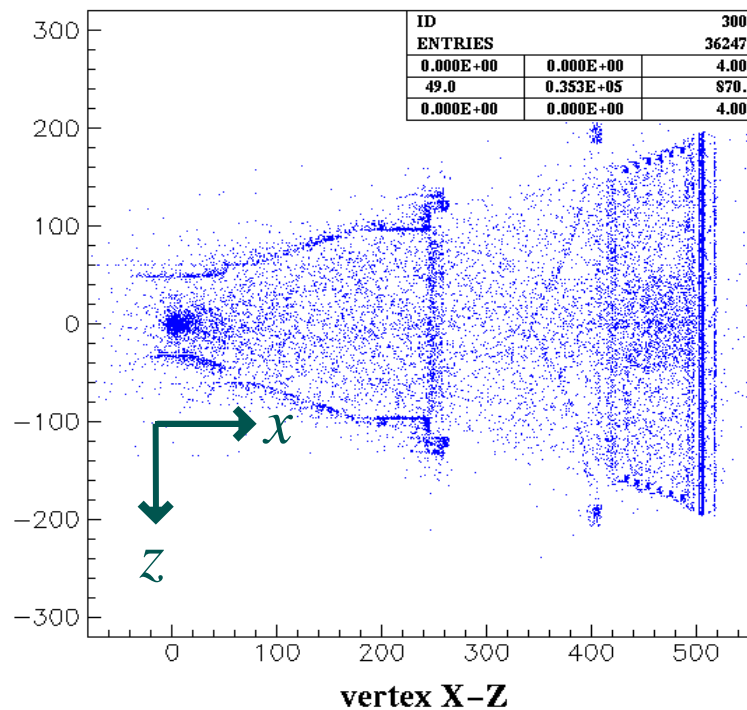
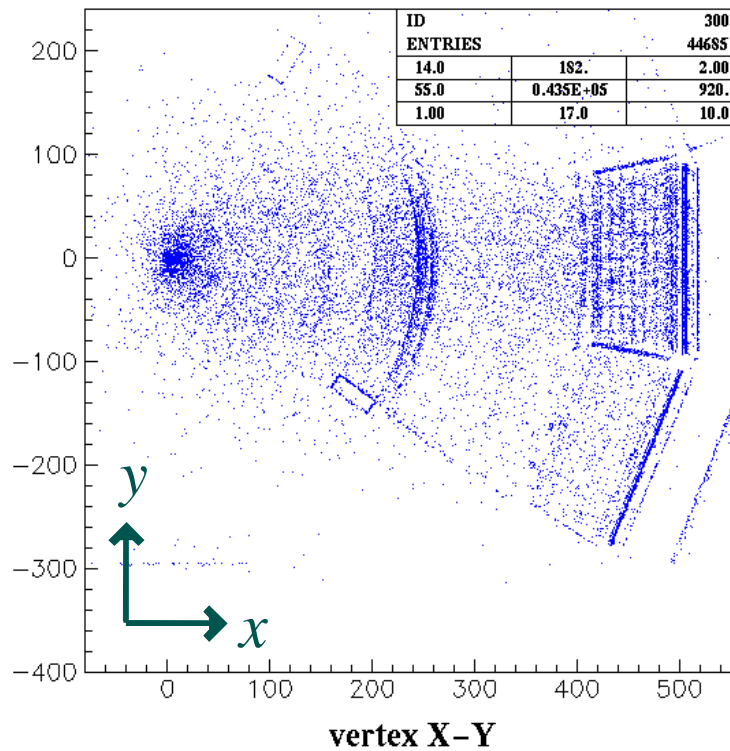
of B.G. particle hits ~ 40 /event

(B.G. : vertex point is out of MVD [R > 25cm])

Check of vertex kinematic information

(using PTRKSTACK routine in PISORP)

Background Source Distribution



Several background source are observed at Inner Tracking Chamber, TEC and TOF materials.

Summary

- We have generated 1000 central Au + Au collisions using HIJING. dN_{ch}/dy was about 1000.
- Using the Tsukuba computer server, 1000 events were simulated with PISA in one day.
- We have developed PISORP-TOF code to include a N-tuple for occupancy and background study.
- TOF occupancy was estimated to be
 2.9% with physics off, and
 6.5% with physics on.
- We have checked the background source distribution for physics-on events, and several background sources were observed at Inner Tracking Chambers, TEC and TOF materials.