LCIO Interface and Study by PandoraPFA

Contents
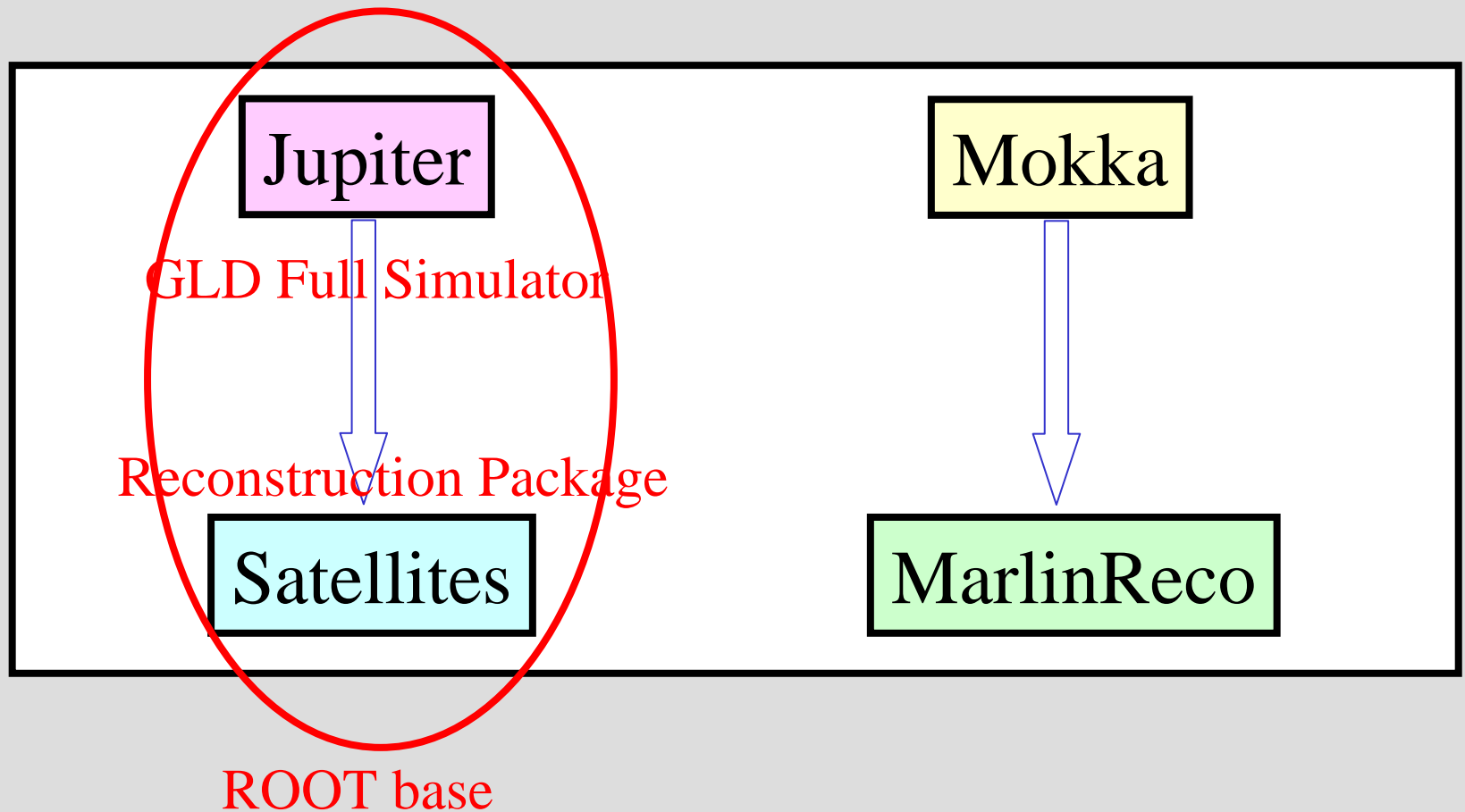1. LCIO Interface
2. Current Performance
3. Summary

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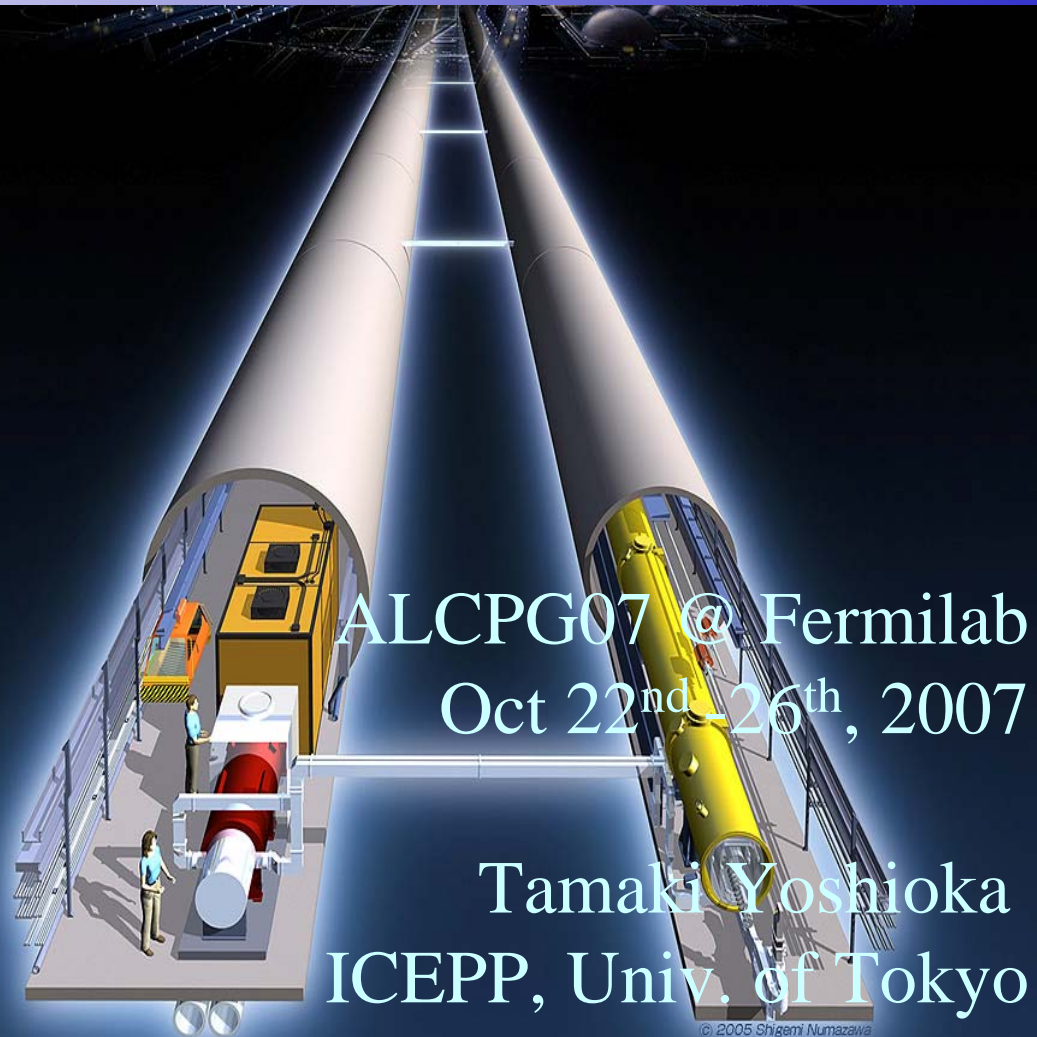
Introduction

• The International Linear Collider Steering Committee (ILCSC) announced a call for Letters of Intent (LOIs) to produce reference designs for the two ILC detectors.

- The LOIs should be sent to the ILCSC by October 1, 2008.
- The LOIs will be reviewed by an advisory body appointed with the approval of ILCSC.

• In order to meet the challenge, GLD and LDC have decided to join their efforts to write a single common LoI.

- First joint concept study meeting was held at LCWS07.

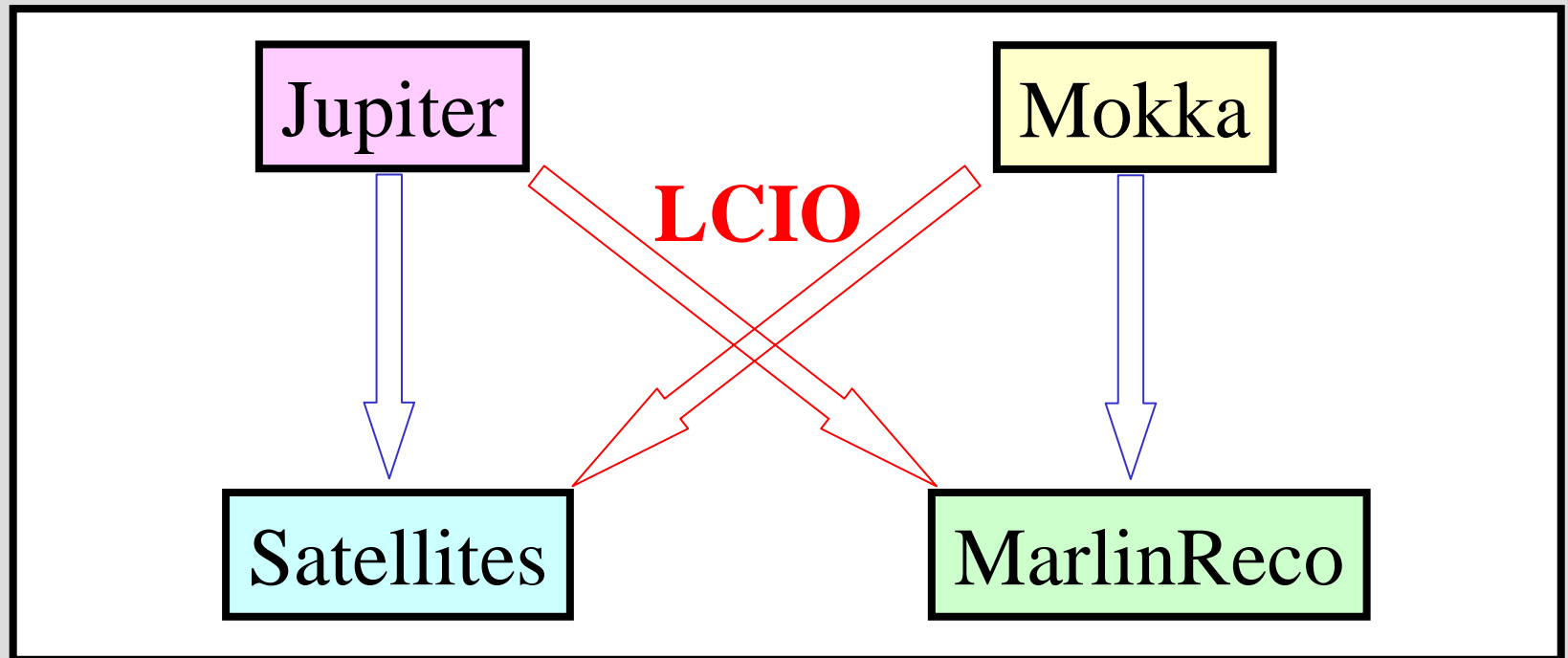→ It is highly desirable to have a software compatibility between GLD and LDC.
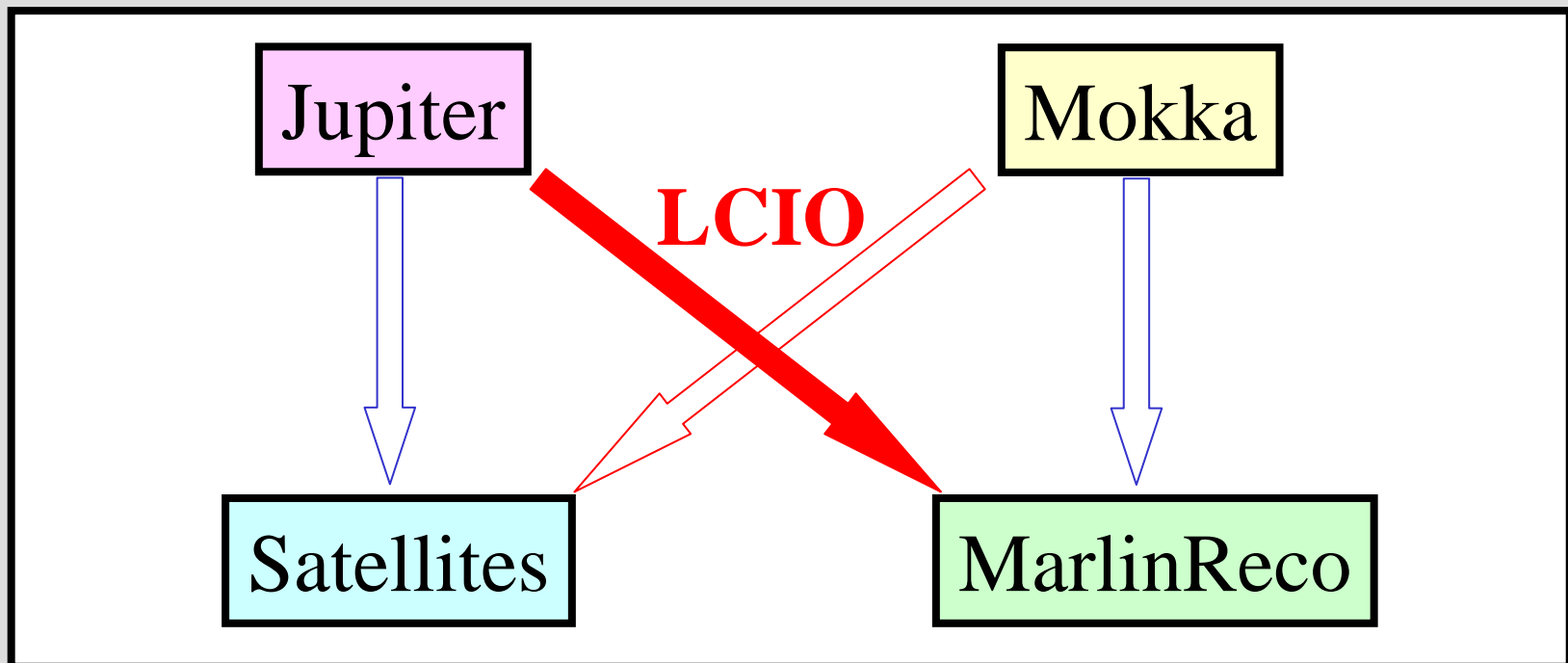
LCIO Interface

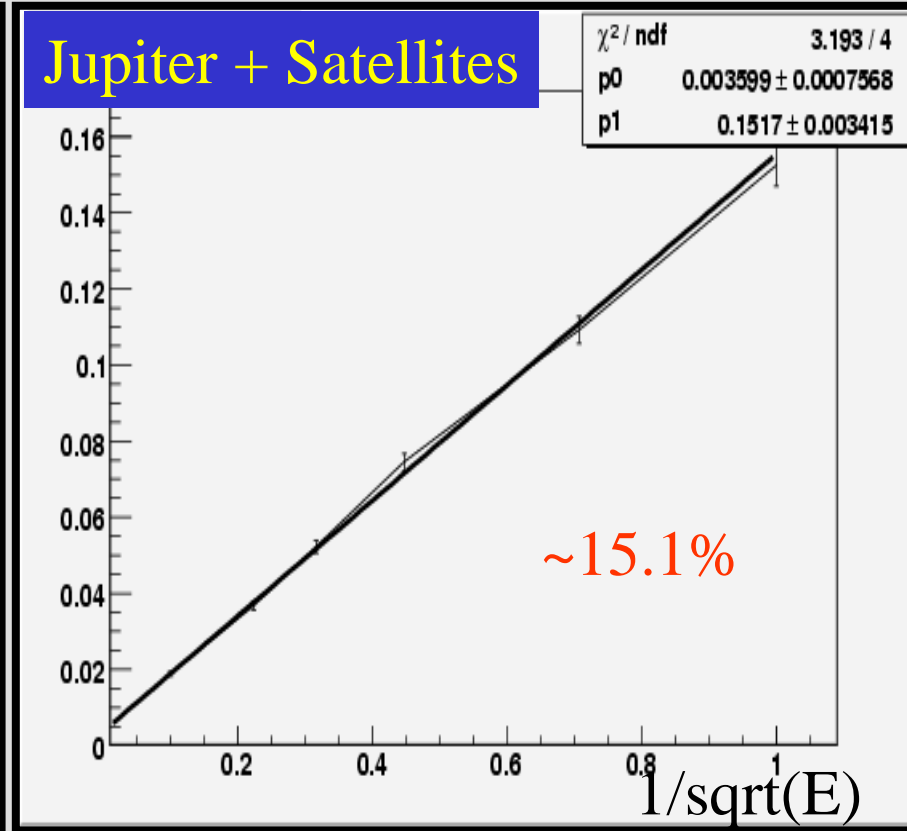# *LCIO Interface*
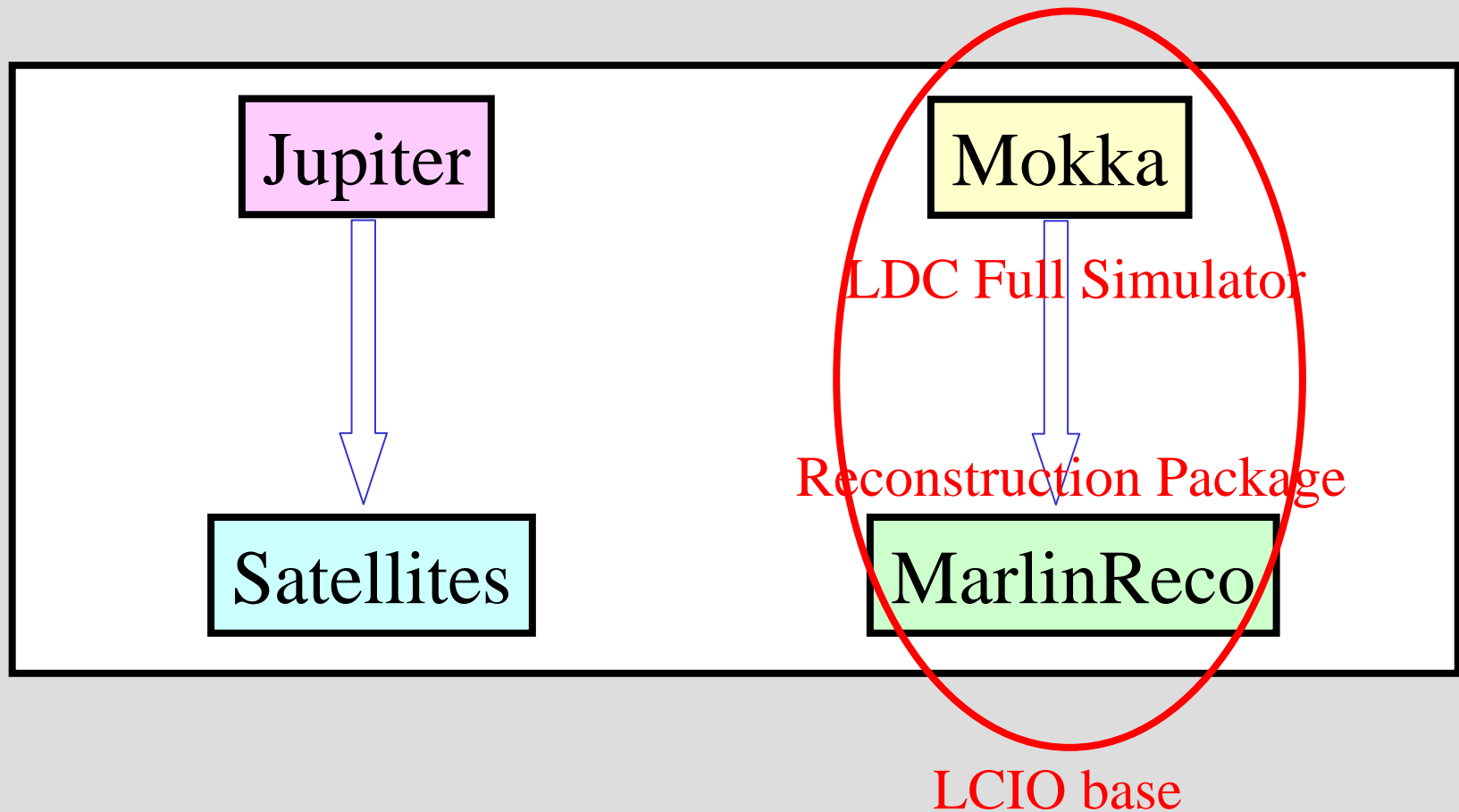
LCIO Interface

LCIO Interface

• An interface which converts Jupiter output to LCIO format has been successfully implemented.
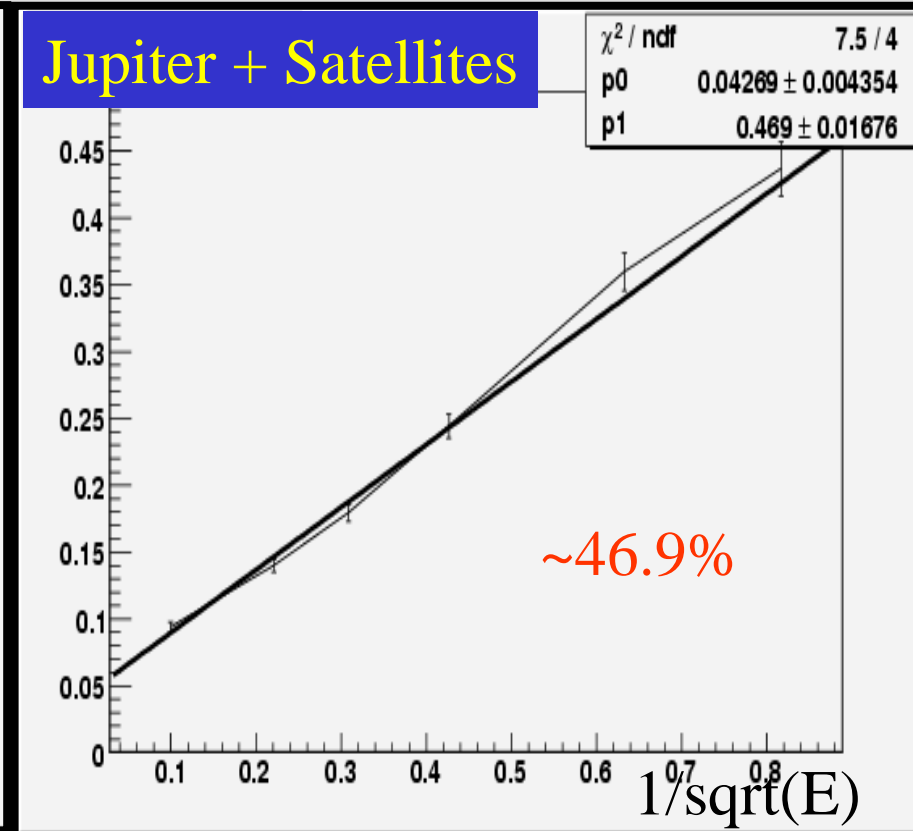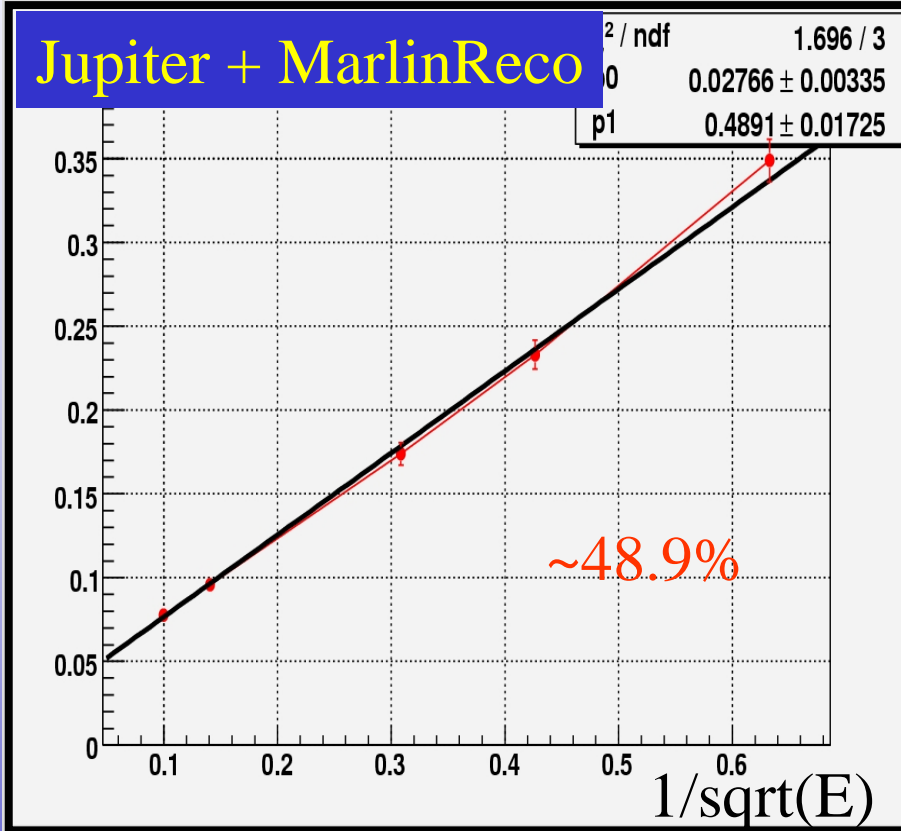
Jupiter

Mokka

LCIO

Satellites

MarlinReco

Performance of single particles, Z→qqbar and Zh events were checked by using the MarlinReco and PandoraPFA.
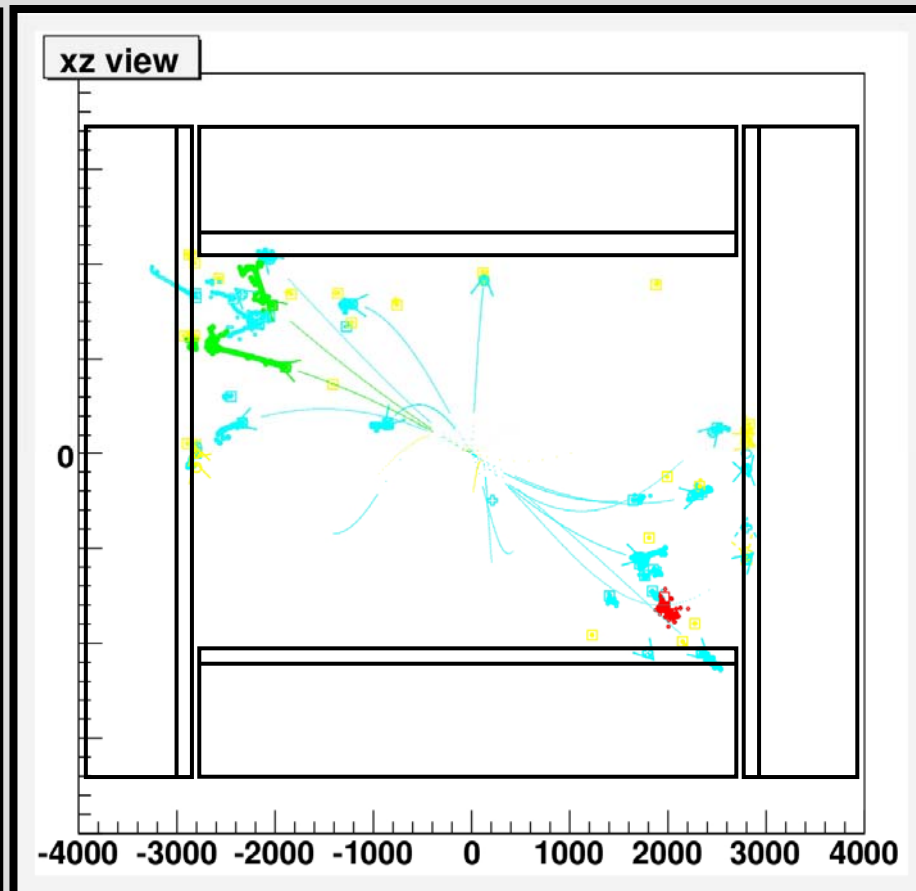
Gamma Energy Resolution
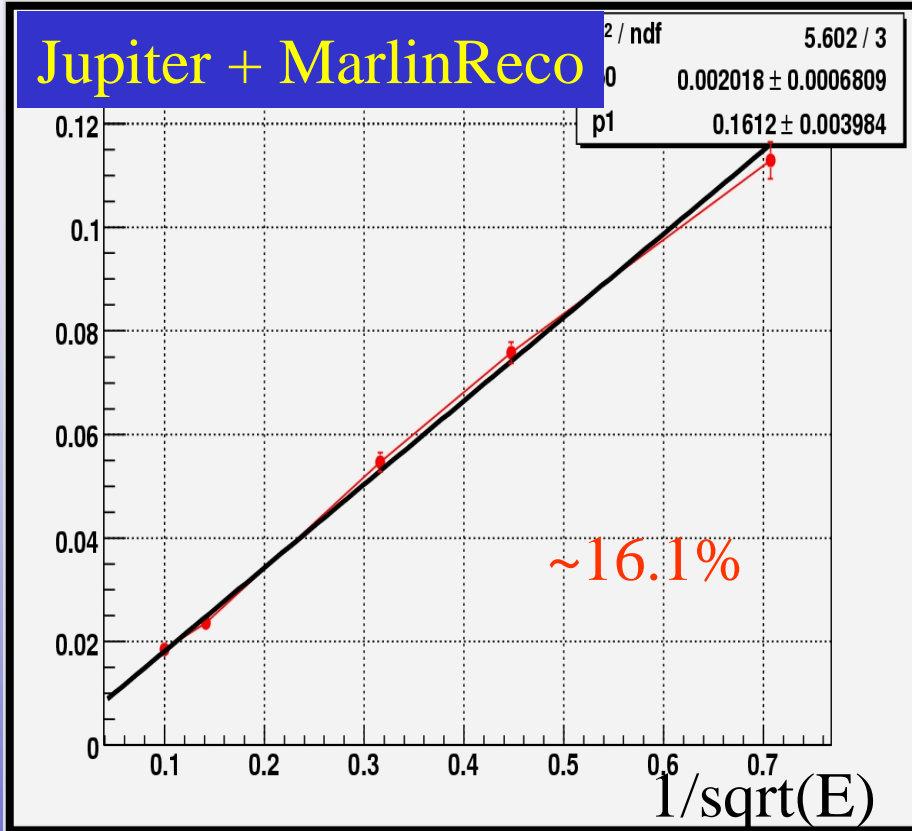
- These plots are calorimeter energy sum, not PFA output.
- Resolution obtained by MarlinReco is consistent with that of Satellites.

Kaon0L Energy Resolution

Jupiter + MarlinReco

χ^2 / ndf	1.696 / 3
p0	0.02766 ± 0.00335
p1	0.4891 ± 0.01725

~48.9%

1/sqrt(E)

Jupiter + Satellites

χ^2 / ndf	7.5 / 4
p0	0.04269 ± 0.004354
p1	0.469 ± 0.01676

~46.9%

1/sqrt(E)
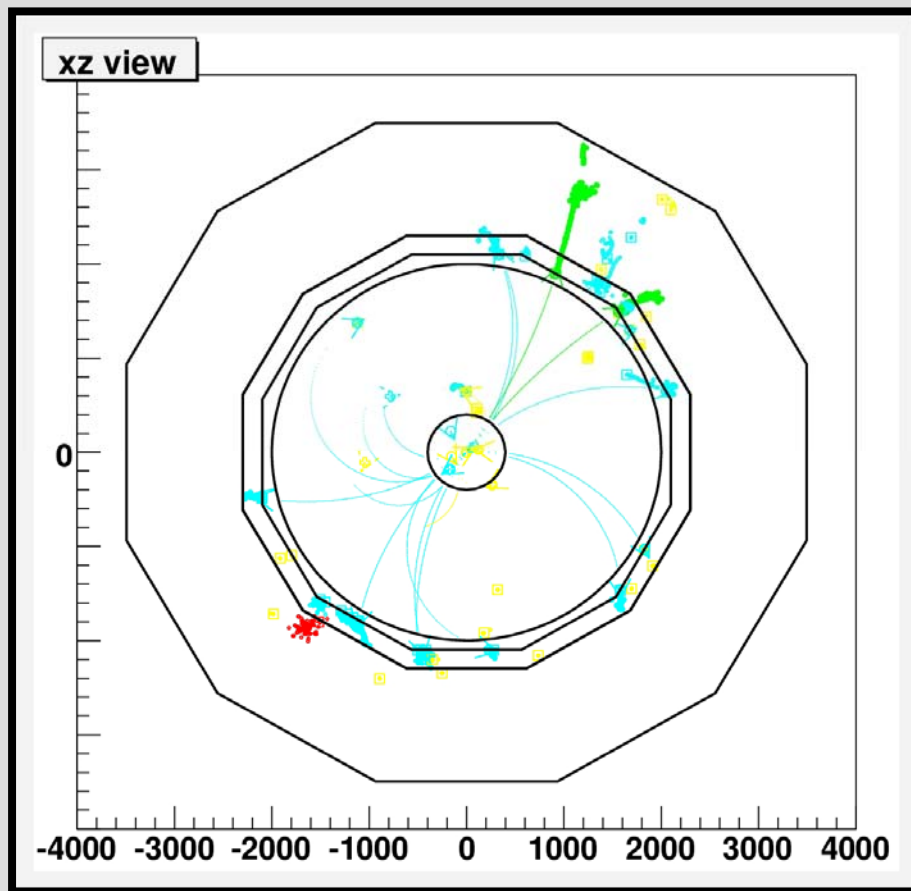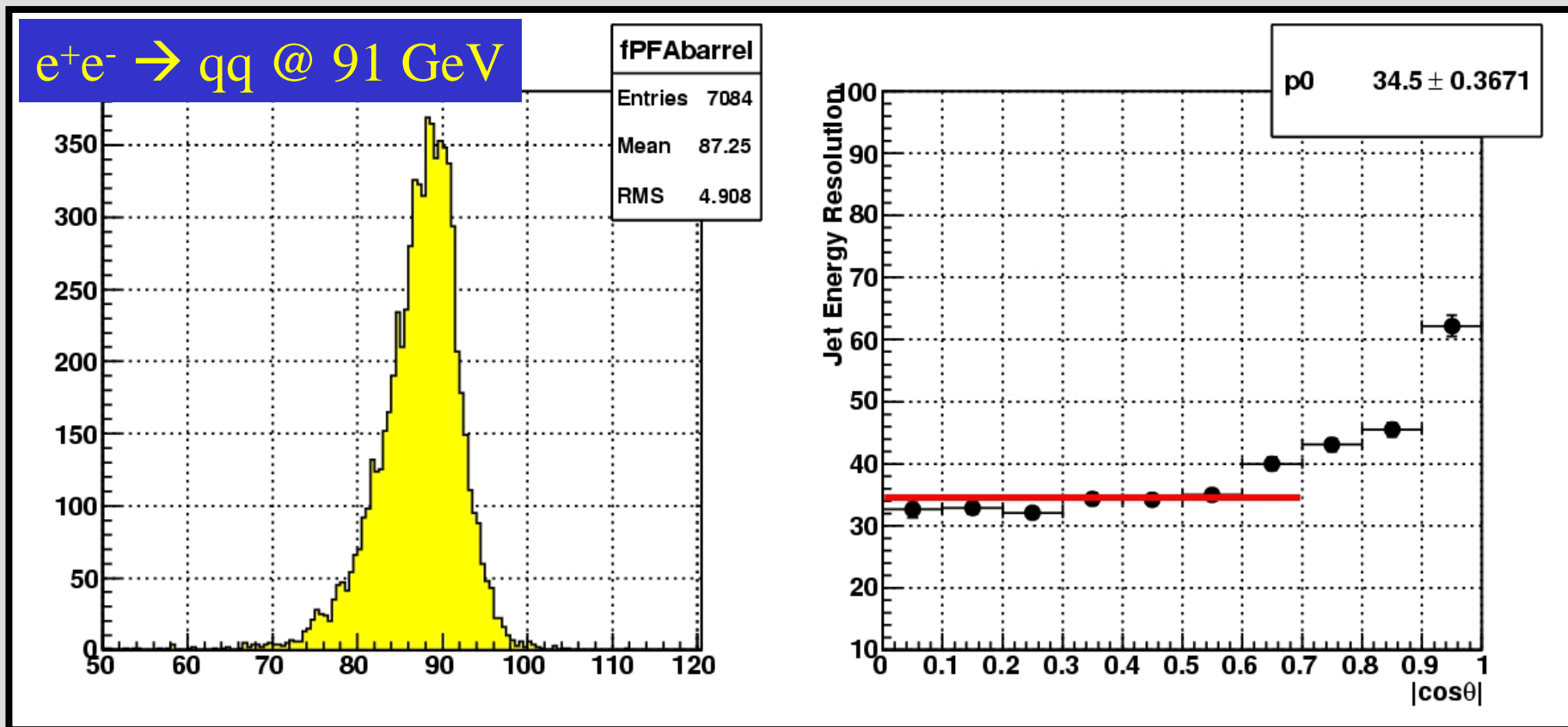
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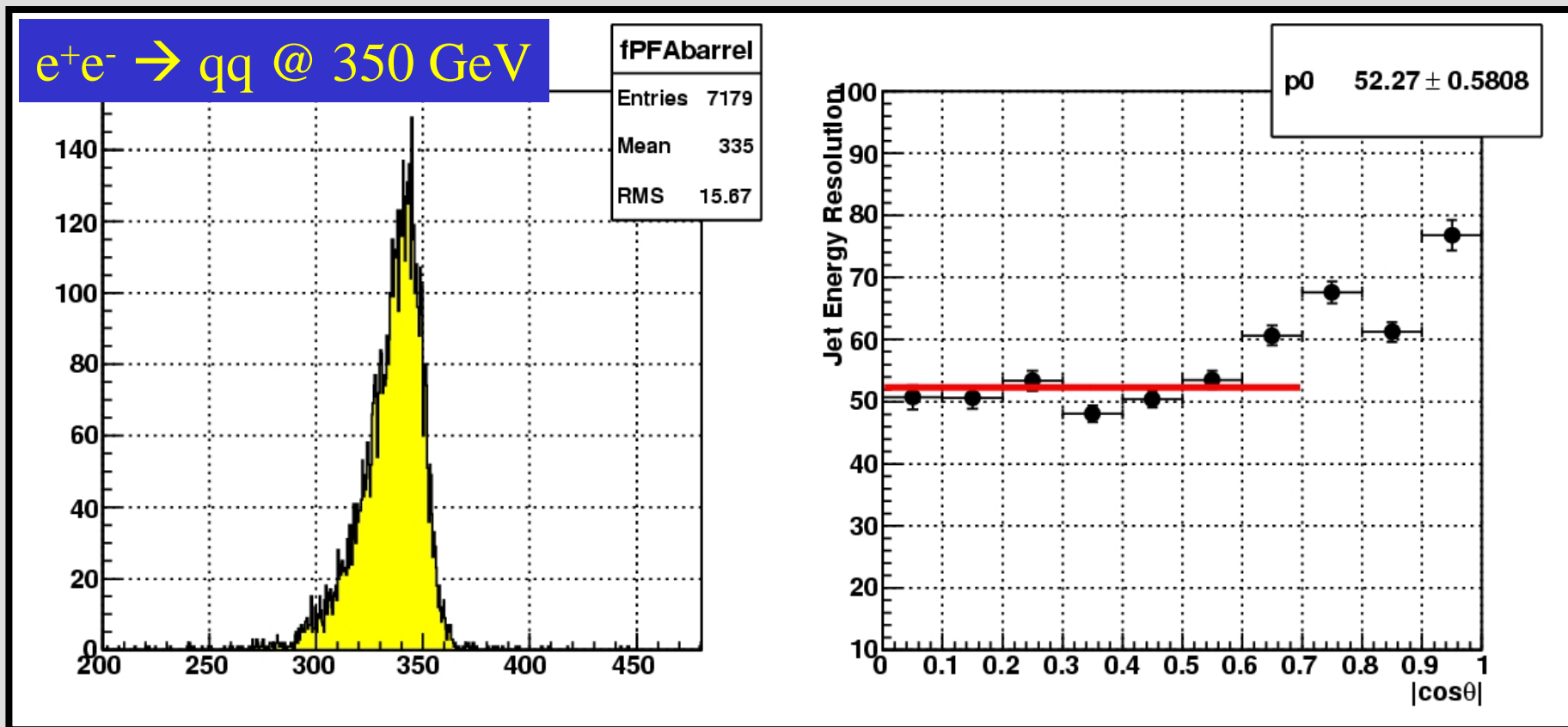
Event Displays (Z-pole)

- Z-pole events: Jupiter LCIO data with MarlinReco/PandoraPFA.
Note : These studies based on Pandora v01, not v02.

Pandora Performance (1)

- Jet energy resolution is obtained to be ~34%/$\sqrt{E}$ in barrel region.
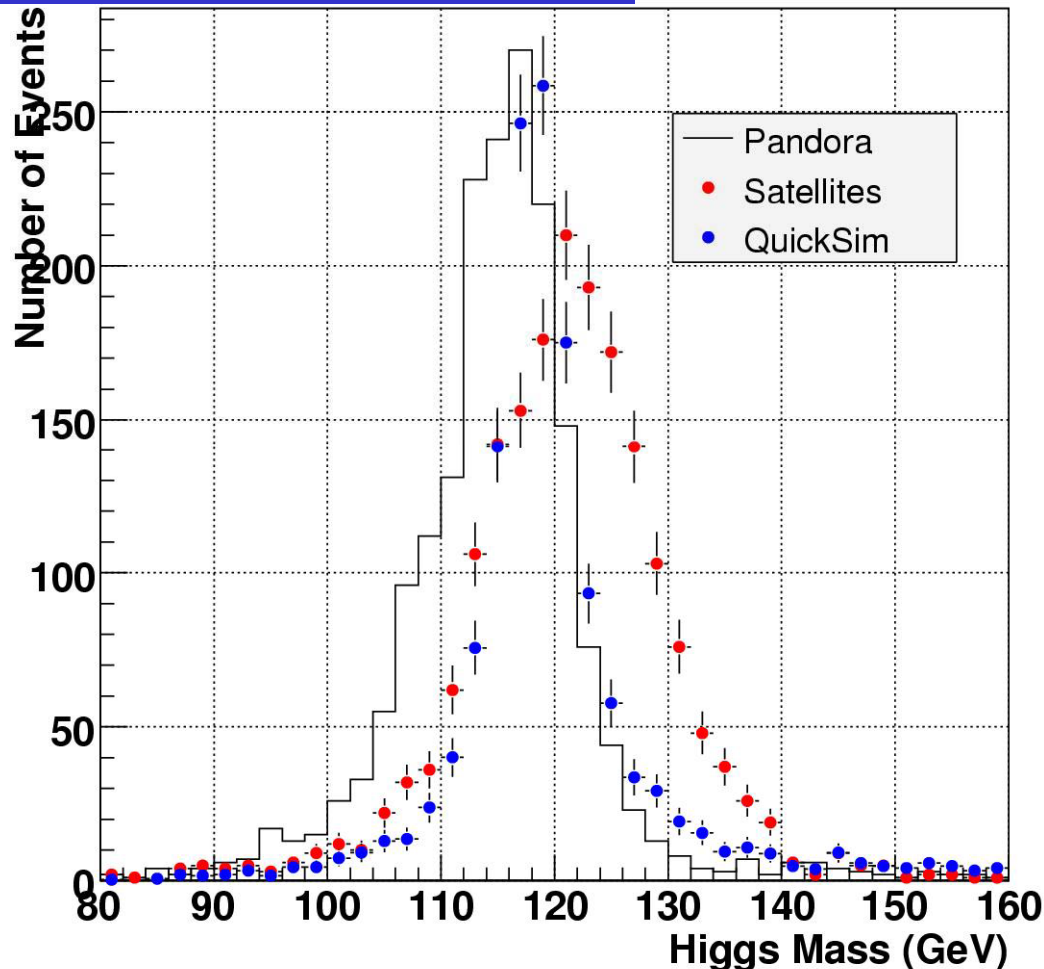- Worse resolution in the EndCap region.

Pandora Performance (2)

e+e- → qq @ 350 GeV

- Jet energy resolution is obtained to be ~52%/$\sqrt{E}$ in barrel region.
- Worse resolution in the EndCap region.

Pandora Performance (3)

ZH $\rightarrow \nu\nu$H @ 350 GeV

- Event Selection
  $90 < \text{Evis} < 200\text{GeV}$
  $|\cos\theta_{jet}| < 0.8$
  $pt > 20$ GeV/c
  $(mm - 91.2)/6 < 10$

- Pandora is closer to Qsim, but lower mass.
  $\rightarrow$ See next page.

- No b-tagging in this analysis: now trying Sonia's vertex finder.

- SatoruJetFinder is working in MarlinReco.

Performance Summary

- Z$^-$ → qqbar

	91 GeV	350 GeV
Jupiter-Pandora	34.5%	52.3%
Jupiter-Satellites	~ 30 %	~ 68 %
Mokka-Pandora	29.5 %	41.9 % (360 GeV)

- ZH → nnH

	RMS90 (GeV)	Mean (GeV)
Pandora	5.3	114.8
Satellites	6.7	121.5
QuickSim	5.0	118.7

→ PandoraPFA is significantly better for high energy jets.

Summary

- LCIO interface has been successfully implemented to the Jupiter.

- Performance of single particles were checked by using the MarlinReco and comparable to those of the Satellites.

- Z →qqbar and ZH events were analyzed by the PandoraPFA and the performance was found to be significantly better for high energy jets.