



Computing Infrastructure

- What's currently available
- Building up the computing infrastructure (discussion)

Hans Wenzel

Fermilab 

Muon Collider 2011

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Computing resources currently available for μ -collider Detector R&D at Fermilab

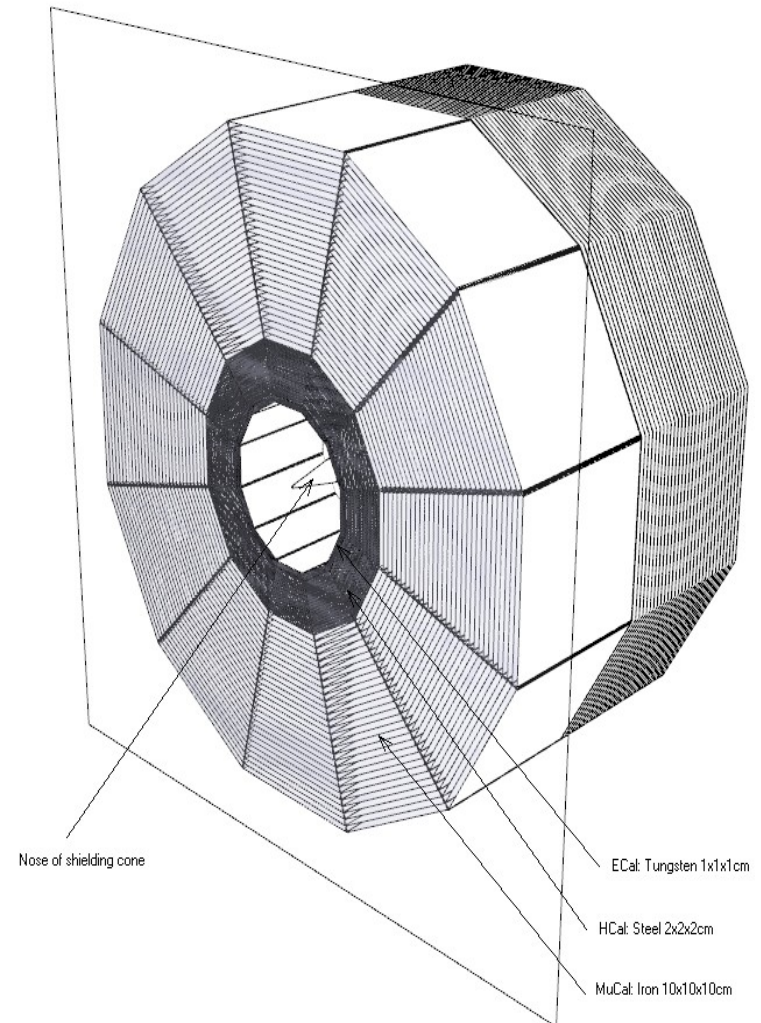
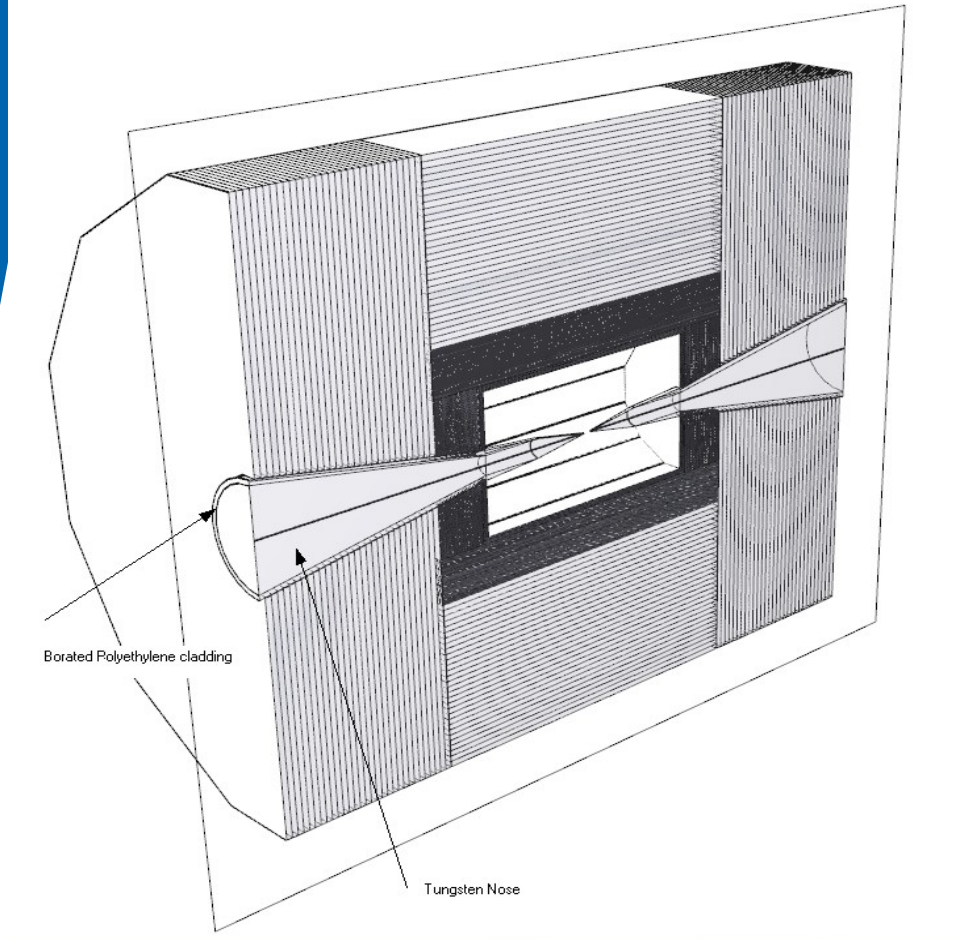
- Modest:

- Fermigrid; ilc/lc VO right now there's an allocation of 200 slots. Plus opportunistic use.
- 4th concept disk resources are being used for ilcroot studies.
- Two ILC frameworks available for muon collider related detector R&D studies ilcroot + lcsim → both good to jumpstart a detector R&D effort.
But probably both need development.
- Interactive: ilcsim, ilcsim2 have software installed
- (not much documentation where to find info)
-

Needs to be scaled up to be able to do the necessary studies.



Muon Collider Detector in Icsim



Norman Graf



Wired Event display

JAS3

File Edit View Tuple Loop Window Help

pi_Theta90_10GeV_SLIC-v2r9p8_geant4-v9r3p2_QGSP_BERT_mcd00.slcio

Welcome View 1

Interaction Picking Settings Cuts

Interaction

Types

- DetectorType
 - Barrel
 - Endcap
- EventType
 - EcalEndcapHits
 - HcalEndcapHits
 - VtxBarrHits
 - MCDParticle

Instances

- Detector
- Event

Apply immediately Apply

Hide Types below level: 3

Hide Instances below level: 3

JAS3Tree WIRED W

Drag to rotate using virtual ball; Shift-drag to rotate over vertical axis; Ctrl-drag to rotate over horizontal axis.

53.9/78.4MB



LCIO-Data Browser

JAS3

File Edit View Tuple Loop Window Help

pi_Theta90_10GeV_SLIC-v2r9p8_geant4-v9r3p2_QGSP_BERT_mcd00.slcio

Settings Cuts Interaction Picking

Interaction

Types

Instances

Apply immediately Apply

Hide Types below level: 0

Hide Instances below level: 0

JAS3Tree WIRED

Welcome View 1 LCSim Event x

Run: 0 Event: 0

Event

- EcalBarrelHits
- EcalEndcapHits
- HcalBarrelHits
- HcalEndcapHits
- INPUT_FILE
- MCParticle
- MCParticleEndPointEnergy
- MuonBarrelHits
- MuonEndcapHits
- TkrBarrHits
- TkrEndcapHits
- VtxBarrHits
- VtxEndcapHits
- MCParticleTree

Collection: HcalBarrelHits size:4820 flags:e0000000

CellIDEncoding: system:0:6,barrel:6:3,module:9:4,layer:13:6,slice:19:5,x:32:-16,y:48:-16

d: module	id: layer	id: slice	id: x	id: y	raw energy (GeV)	corrected energy (GeV)	X (mm)	Y (mm)	Z (mm)	time (ns)
0	0	-13	-1		.022463	.022463	-1057.1	-899.01	10.000	4.6757
1	0	-13	-1		.025812	.025812	-1074.4	-909.01	10.000	4.6908
2	0	-14	-1		.063353	.063353	-1081.8	-936.33	10.000	4.7686
4	0	-14	0		.038508	.038508	-1116.4	-956.33	-10.000	4.8799
3	0	-13	0		.059966	.059966	-1109.1	-929.01	-10.000	4.8308
4	0	-13	0		.088197	.088197	-1126.4	-939.01	-10.000	4.8791
3	0	-14	0		.10534	.10534	-1099.1	-946.33	-10.000	4.8200
4	0	-15	-1		.0016754	.0016754	-1106.4	-973.65	10.000	4.9638
4	0	-14	-1		.26900	.26900	-1116.4	-956.33	10.000	4.8863
4	0	-15	0		.0017762	.0017762	-1106.4	-973.65	-10.000	4.9635
5	0	-14	0		.072495	.072495	-1133.7	-966.33	-10.000	4.9558
5	0	-14	-1		.36851	.36851	-1133.7	-966.33	10.000	4.9463
11	0	-12	2		.0041166	.0041166	-1257.7	-991.69	-50.000	5.4058
8	0	-13	2		4.7690E-4	4.7690E-4	-1195.7	-979.01	-50.000	5.2143
7	0	-13	2		.0052083	.0052083	-1178.4	-969.01	-50.000	5.1486
6	0	-13	1		.026708	.026708	-1161.0	-959.01	-30.000	5.0455
5	0	-13	0		.070351	.070351	-1143.7	-949.01	-10.000	4.9593
0	0	-14	0		2.5901E-4	2.5901E-4	-1047.1	-916.33	-10.000	4.9089
0	0	-13	0		1.9779E-4	1.9779E-4	-1057.1	-899.01	-10.000	4.9048
1	0	-14	-1		5.0336E-4	5.0336E-4	-1064.4	-926.33	10.000	4.8222
3	0	-13	-1		.041011	.041011	-1109.1	-929.01	10.000	4.8197
3	0	-14	-1		.073434	.073434	-1099.1	-946.33	10.000	4.8352
4	0	-13	-1		.034026	.034026	-1126.4	-939.01	10.000	4.8874
1	0	-15	-1		5.0607E-4	5.0607E-4	-1054.4	-943.65	10.000	4.8875
3	0	-15	-1		.0025729	.0025729	-1089.1	-963.65	10.000	5.0816
2	0	-16	-2		1.6996E-5	1.6996E-5	-1061.8	-970.97	30.000	5.1060
1	0	-16	-3		9.3358E-4	9.3358E-4	-1044.4	-960.97	50.000	5.0011

Drag to rotate using virtual ball; Shift-drag to rotate over vertical axis; Ctrl-drag to rotate over horizontal axis.

34.3/74.9MB

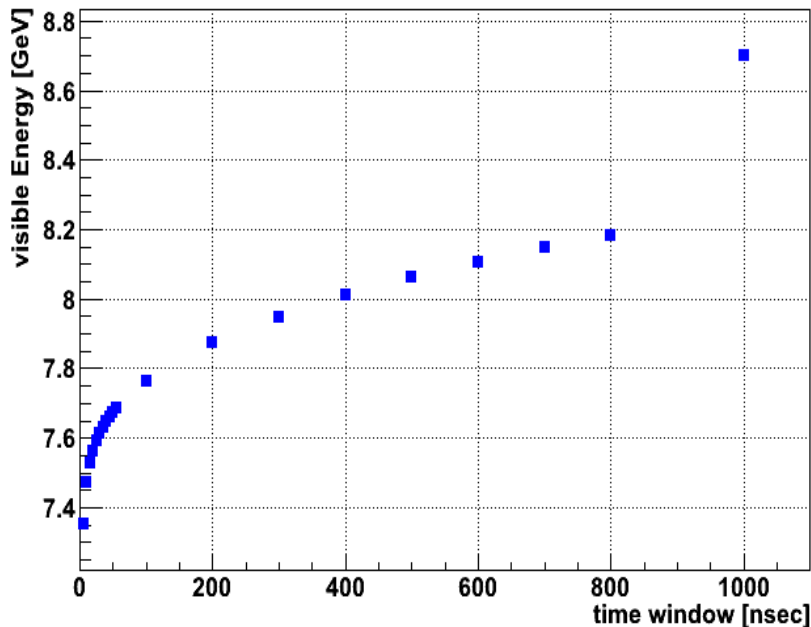


Temporal development of hadronic showers

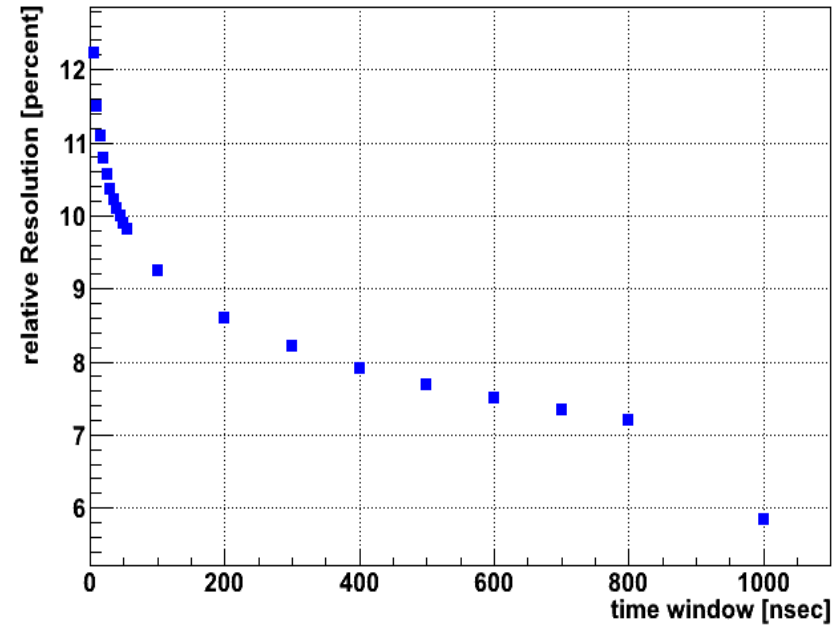
Student: Alex Conway from the university of Chicago.

Single particle Data sets using mcd00 detector found in:
<ftp://ftp-lcd.slac.stanford.edu/ilc3/MUC/backgrounds/slci0/slci/>

Energy response



Energy response

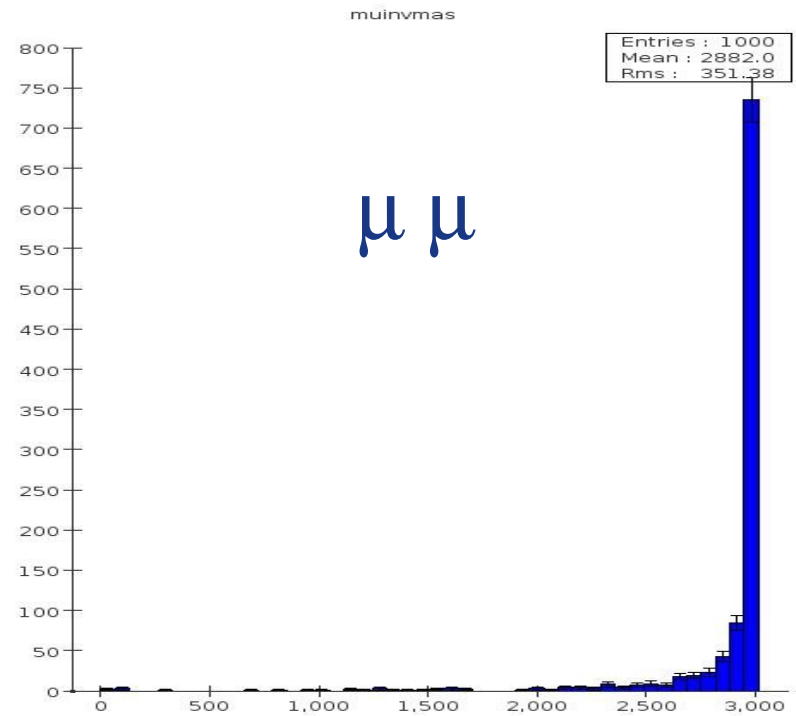
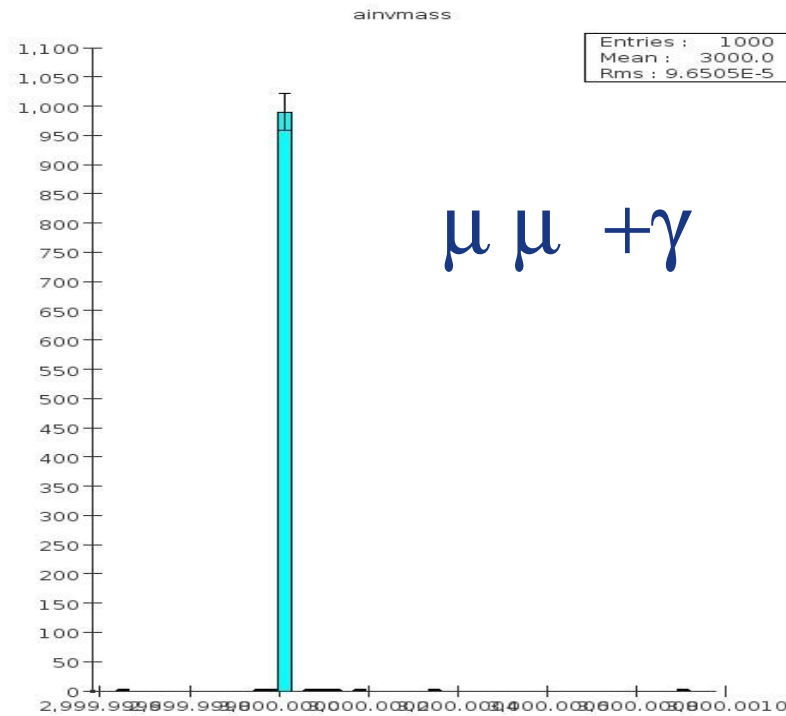




Physics data

They are located in
/sim1/home2/misc1/mrenna/muc/files
which is e.g. mounted from ilcsim/ilcsim2

e.g. 3TeV Z'.





Computing infrastructure

If funds are available in FY11 how should we use them. Probably the best way to get started is to provide:

1) interactive node to replace ilcsim/2"

This serves as reference platform with all software installed and working

2) Grid Virtual Organization (VO) for Muon Collider studies and have enough slots on the Grid:

3) provide Disk space



1) Interactive node: (replacement of ilcsim)

- could be part of GPCF cluster -->contact person Stu Fuess. This is already setup this way for intensity frontier experiments (e.g. mu2e)



2) Grid (contact Steven Timm)

- Need to establish VO for Muon Collider.
- For FY 11 too late to contribute to any farm node purchases.
- According to Steven it would be good to have a presentation at the Monday Grid users meeting to define our needs and plans. (next meeting July 25th and Aug 8th probably too early)
- They want to know who is representing the muon collider community with regards to computing



3) Disk Space:

- part of blue arc system. (contact: Ray Pasetes).
- Will have to talk to him if they want us to contribute buying disks



But computing resources are only one aspect

- If we want to make progress we need to take this seriously!
- Goal should be to create the infrastructure to attract physicists to work on the muon collider:
 - Guarantee that software is working (on a reference platform)
 - Kept up to date
 - Documented
 - There are experts who can help
 - Enough computing resources are available.
 - documentation: use automatic systems like doxygen, lxr,
 - code repositories : SVN
 - ...
- Start using the software/computing resources should be painless and easy
 - Procedure for visitors ID, computing account creation, grid certificate, VO membership etc. has to be in place and well documented. (web based)
 - Get started instructions have to be in place
 - Well advertised.