



The PHENIX Multiplicity Vertex Detector

Jehanne Simon-Gillo
Los Alamos National Laboratory

**TAC '97
Brookhaven National Laboratory
May 2, 1997**

MVD Overview

Physics Goals:

- * Charged particle multiplicity
- * $d^2N/d\eta d\phi$
- * Centrality trigger at LVL-1
- * Collision vertex position ($\sigma < 2\text{mm}$)

Design Criteria:

- * Large rapidity coverage ($\Delta\eta = 5$)
- * Good azimuthal coverage & granularity
- * Minimum material in electron arm acceptance

Key parameters:

- * Clamshell design - mounts to magnet pole faces
- * Silicon strip barrels (200 μm pitch, 64cm length)
- * Silicon Pad endcaps at +/- 35cm
- * Radiation length $< 1\%$ for 2 silicon layers
- * Weight approximately 28 pounds
- * 35K Total channels
- * Electronics are air-cooled and motherboard is liquid cooled



Clamshell design - mounts to magnet pole faces
Inner and Outer barrels of silicon strip detectors
200um, 64cm long
Silicon pad endcaps +/- 35cm

Strip electronics
at bottom

256 ch/ Si detector

Channel count =
34,816

MVD Collaboration

Detector Council Member: J. Simon-Gillo (LANL)
Mechanical Coordinating Physicist: J. Simon-Gillo (LANL)
Electronics Coordinating Physicist: J.P. Sullivan (LANL)
Lead Mechanical Engineer: J. Boissevain (LANL)
Lead Silicon Design and Electronics Engineer:
J. Kapustinsky (LANL)
Lead Integrated Chip Design Engineer: C.L. Britton (ORNL)
Lead Interface Module Engineer: N. Ericson (ORNL)
Systems Integration Engineer: J. Boissevain (LANL)
Simulation Computing: H. van Hecke (LANL)
Off-line Computing: J.P. Sullivan (LANL)
On-line Computing: H. van Hecke (LANL)
Database Coordinator: H. van Hecke (LANL)

25 Participants: Faculty/Staff (7), PostDocs (1), Engineers (4), Students (5), Support (2)

5 Institutions: Los Alamos National Laboratory, OakRidge National Laboratory, University of California at Riverside, Yonsei University, University of Alabama at Huntsville.

Recent Technical Progress

Chain Test complete - (4/96)

Bench to beam: Detector+electronics+cable+DAQ

Preliminary Mechanical Design Review - (8/96)

Preliminary Electronics Review - (12/96)

Safety Review - (4/97)

Design of electronic die complete (3/97) - Fab pre-production

Pre-prototype MCM in fabrication (3/97)

Investigating Known Good Die Options (1/97)

Started design of interface modules - (2/97)

On schedule, pre-production in summer

Full-scale prototypes of ALL mechanical components (6/96...)

Including magnet and nose-cone mockup

Complete Design of cooling systems - (3/97)

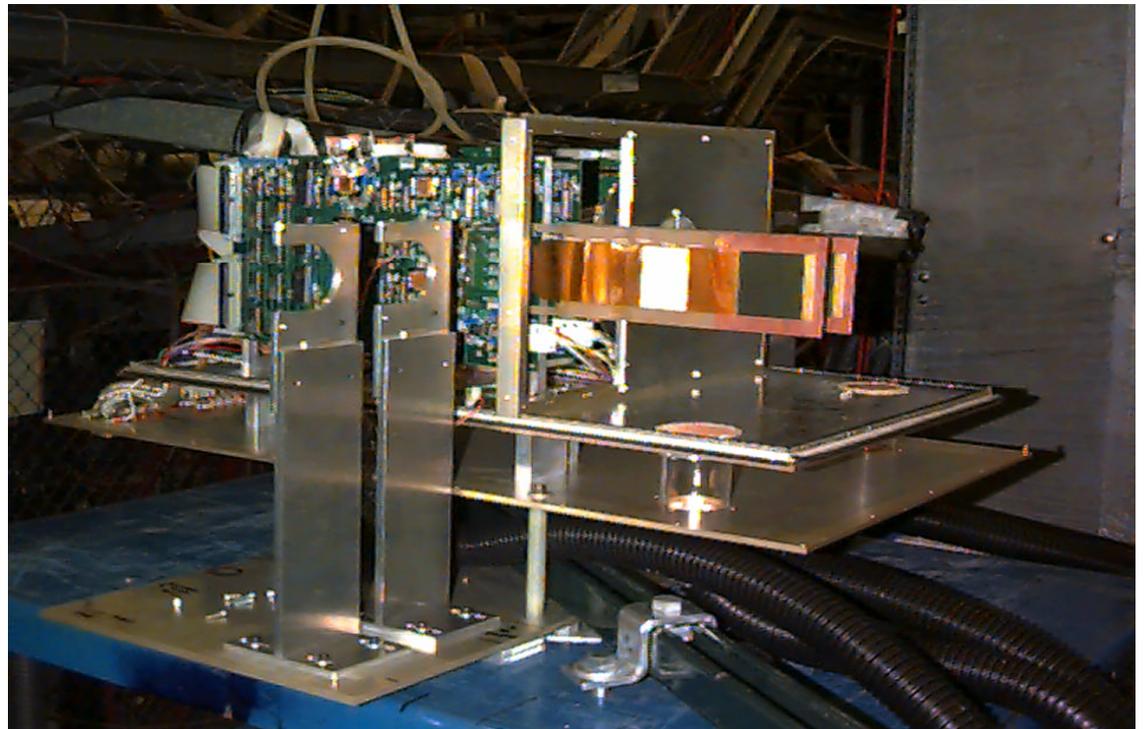
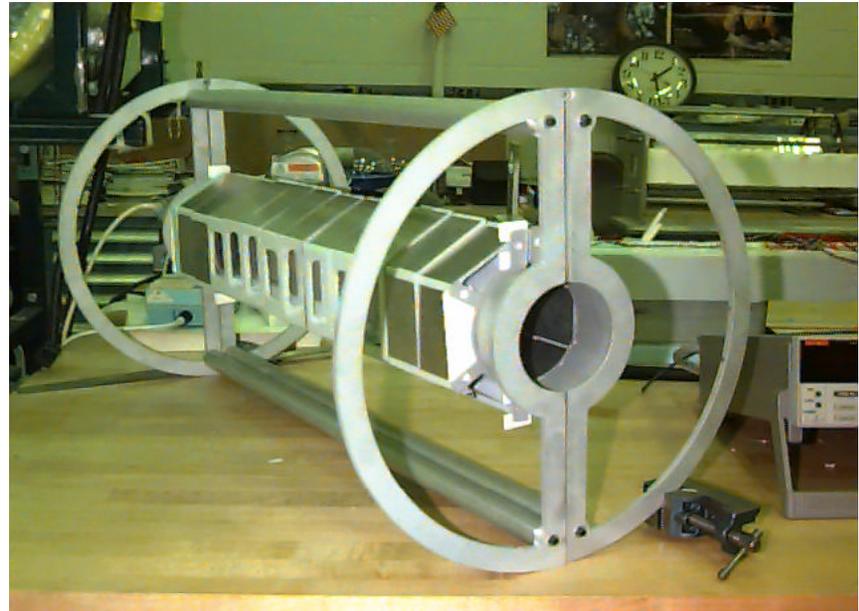
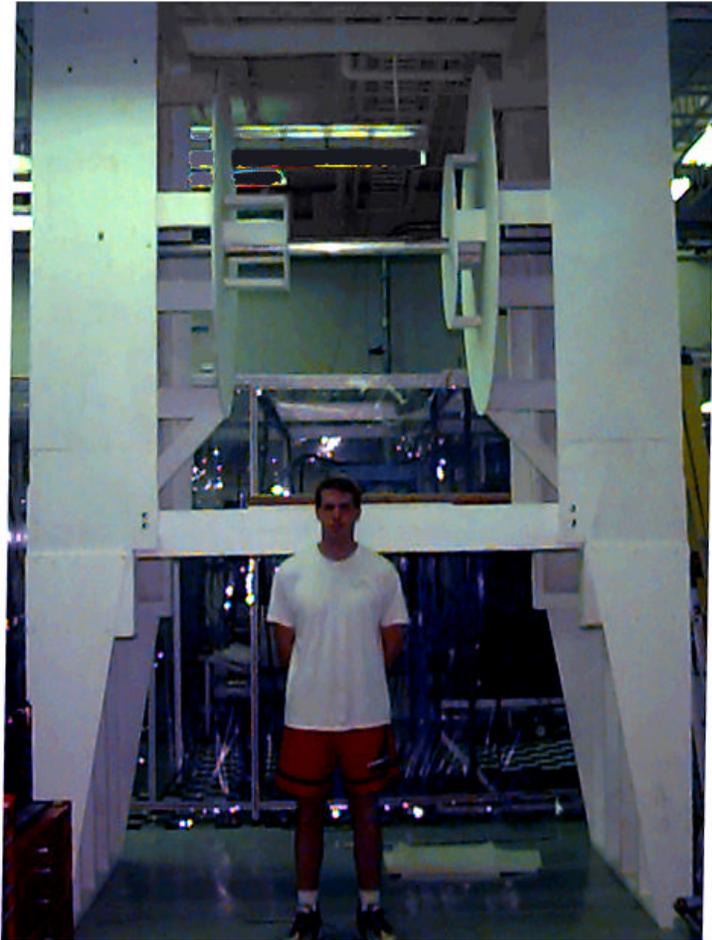
Testing production silicon strip detectors (11/96...)

Testing single and double metal pad detectors (1/97)

Prelim results from double metal acceptable

Rohacell cage production factory at UCR (2/97)

Significantly increased manpower (1/97)



Some Future Key Milestones

MECHANICS

Pad Detector Design Complete	6/97
Final Mechanical Design Review	7/97
Test Vertex Detector Assembly	10/97
All Detectors Tested	2/98
Detector SubAssemblies Tested and Complete	10/98
MVD Assembly Complete	2/99
MVD Operational	4/99

ELECTRONICS

Moth, Pow/Com Tested & Complete	10/97
Interface Modules Complete	11/97
Chip Fabrication Complete	1/98
Full chain test MCM Pre-production	2/98
MCMs Complete	7/98
Electronics Complete	7/98

Key Cost Growth

Total Cost:

FY97 = \$3.0M

FY96 = \$2.5M

Increase in cost approximately \$0.5M

DOE cost = \$2.7M (out of \$3.0M)

LANL Contribution approximately \$0.3M

Mechanics:

Total = \$1.3 + \$0.2M = \$1.5M

\$0.1M net decrease (FY96 = \$1.6M)

\$0.15M decrease - moved to FEE

\$0.05M increase: Past LANL contribution

Electronics:

Total = \$1.4M + \$0.1M = \$1.5M

\$0.6M net increase (FY96 = \$0.9M):

\$0.09M decrease: Impact of Common FEE

\$0.09M increase: Heap Manager

\$0.09M increase: Engineering and prototype

\$0.08M increase: Fab costs

\$0.43M increase: Motherboard, PowCom, Interfaces...

Issues and Concerns

Cost and Schedule

Increased costs

MVD operational 4/99

Tight, aggressive, many tasks in parallel

Multiple prototypes removed, pre-production only

Possible Beam Test - Spring 98

MCM

Known Good Die Strategy

Firm vendor quote

Production schedule

Manpower

Much improved - need to maintain, continue increasing