



Layer 0 Sensor PRR

Outline:

- Overview (R. Lipton)
- Sensors (M. Demarteau)
- Testing (B. McCarthy)

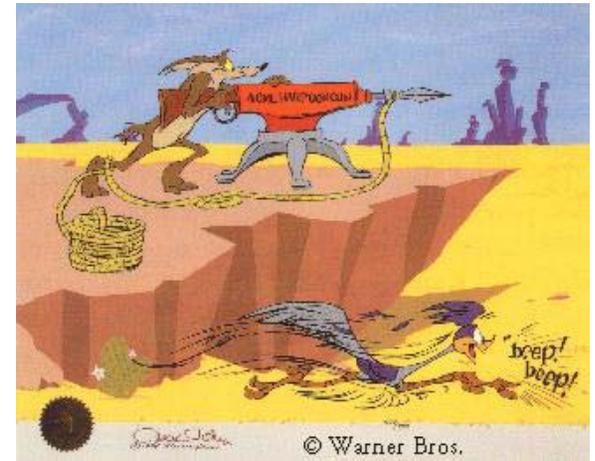




Layer 0 Sensor PRR

Some history ...

- August 2003, Layer 0,1 sensor PRR
- Sept 3, 2003 Run2b silicon upgrades cancelled
- Sept 25 – Layer 0 design workshop
- Nov 5 – Final PMG Layer 0 design presentation. DOE/NSF project costs established
- Dec 16 – mechanical design parameters frozen – proceed with drawings and procurement.



Run2b design for: sensors (different pitch, length), 2 chip hybrids, modified design for analog cables and support structure.

Changes from Run2b: support structure geometry, ceramic pitch adapter



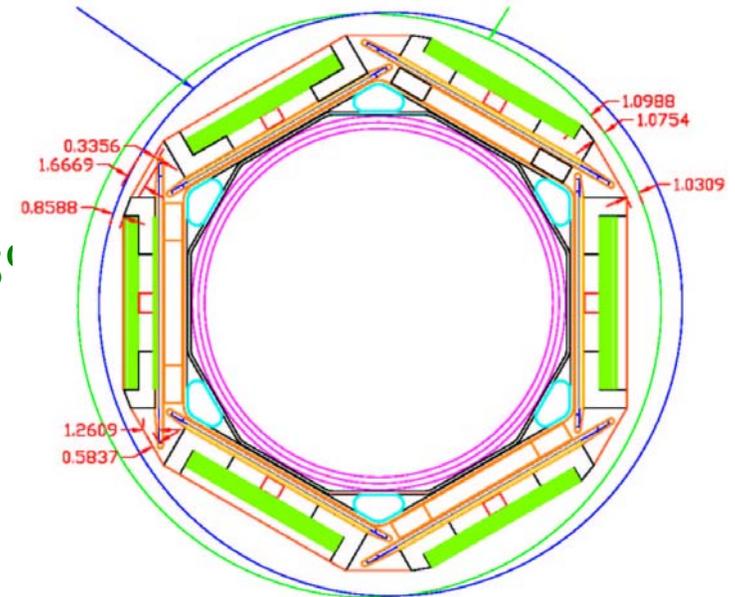
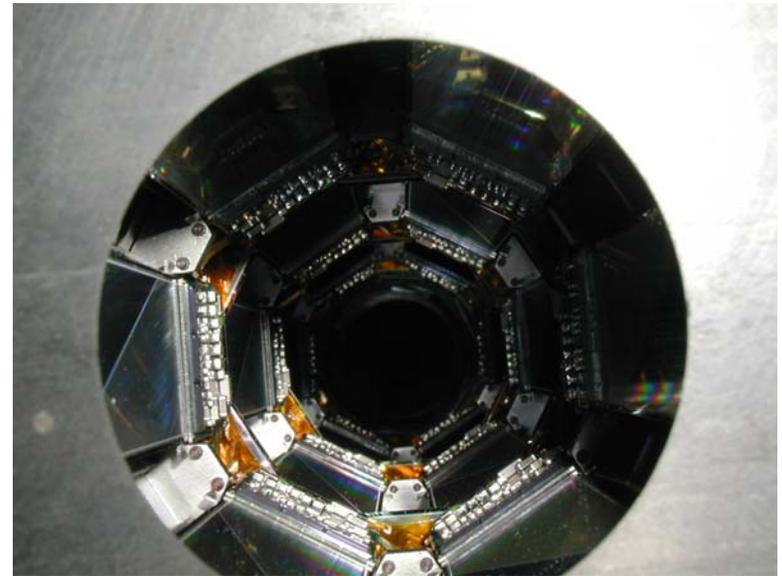
Overall Design

Design dictated by space constraints

- $R_{\text{outer}} < 2.3 \text{ cm}$
- Maximal ϕ coverage
- Match existing detector z coverage
- Maximal z segmentation dictated by cable stackup

Decisions

- 8 fold z segmentation 4x12, 4x7 cm
- Different inner/outer sensor pitch
 - Increase acceptance by 4% to $>98\%$
 - Overlap for alignment
 - About the same cost (HPK)





Cost and Schedule

	FY 02 \$ no G&A	M&S non-labor	M&S Labor	M&S Cost	Cont %	M&S Cont	Total M&S	FNAL Labor	Labor Cont %	Labor Cont	Total Labor	Total Cost (incl labor)	Cost + Cont
1	Layer 0 Silicon Detector	\$573,805	\$208,379	\$782,184	73%	\$573,426	\$1,355,610	\$535,847	50%	\$267,923	\$803,770	\$1,374,921	\$2,216,270
1.1	Sensors	\$163,000	\$1,200	\$164,200	100%	\$164,200	\$328,400	\$14,940	50%	\$7,470	\$22,410	\$179,140	\$350,810
1.2	Readout Electronics	\$281,708	\$117,840	\$399,548	76%	\$303,461	\$703,009	\$198,629	50%	\$99,314	\$297,943	\$619,577	\$1,022,352
1.3	Mechanical Design and Fab	\$49,686	\$89,339	\$139,025	50%	\$69,413	\$208,438	\$134,192	50%	\$67,096	\$201,288	\$273,217	\$409,726
1.4	Layer 0 Detector Modules	\$16,711	\$0	\$16,711	75%	\$12,503	\$29,214	\$74,076	50%	\$37,038	\$111,114	\$90,787	\$140,328
1.5	Final Detector Integration	\$25,700	\$0	\$25,700	50%	\$12,850	\$38,550	\$60,202	50%	\$30,101	\$90,303	\$85,902	\$128,853
1.6	Monitoring	\$12,000	\$0	\$12,000	50%	\$6,000	\$18,000	\$0		\$0	\$0	\$12,000	\$18,000
1.7	Software and Simulation	\$0	\$0	\$0		\$0	\$0	\$42,300	50%	\$21,150	\$63,450	\$42,300	\$63,450
1.8	Silicon Project Administration	\$25,000	\$0	\$25,000	20%	\$5,000	\$30,000	\$11,508	50%	\$5,754	\$17,262	\$71,998	\$82,752

HPK sensor quote ~\$100k (\$64k less than estimate) – no quote on delivery

ID	Milestone	2004				2005				2006			
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2		
112	Freeze Mechanical Parameters												
9	Release Sensors for Production												
24	Release Hybrids for Production												
45	Release Analog Cables for Production												
48	All Analog Cables Delivered and Tested												
15	All Sensors Delivered and Tested												
39	All LO Hybrids Delivered, Stuffed, and Tested												
94	All Adapter Cards Delivered and Tested												
163	Silicon LO Module Production Complete												
191	Layer 0 Silicon Detector Ready to Move to DAB												



Personnel and Organization

Six month sensor production – based on Run2b experience but will be critical path if ~2 months late. Sensor order date – March 19 – hope to be ~ 6 weeks early

This is much smaller than the Run2b project – all M&S from NSF MRI grant.

- Sensor leadership – M. Demarteau, B. McCarthy (Stony Brook)
 - R. Demina, F. Lehner involved on a consulting basis
- All strip testing at Stony Brook, Sensor VIs at FNAL
- Radiation testing at KSU