

Scope of FNAL-based Muon R&D

Letter from the Director → we are asked to execute 5 tasks:

1. Leadership of the cooling simulations for the second generation neutrino factory study being undertaken at BNL.
2. Simulations aimed at defining a muon beam cooling experiment.
3. Creation of an absorber test facility at Fermilab.
4. Completion of the 805 Mhz R&D program, and subsequent creation of a 200 Mhz high power test facility at Fermilab.
5. Further development of the physics and detector studies associated with the neutrino factory.

FNAL-based Muon R&D: Scientist FTEs

Division	FTEs
PPD	3.7
BD	3.5
CD	1.0

1. Scientist FTEs are not included in the budget requests that follow.
2. Proton driver R&D is assumed to be a separate R&D task, and is not included in the above, or in the budget requests that follow.

Muon R&D: FY01 Particle Physics Div. Request

	M&S (K\$)	Effort (FTE)	Labor (K\$)	SUM (K\$)
LH2 absorber facility preparation (based on J. Kilmers estimate, assume 50% of it is labor)	76	0.9	76	152
Absorber installation & operations	10	0.8	68	78
Instrumentation development	30	—	—	30
Travel	30	—	—	30
General operations	50	—	—	50
Total	196	1.7	144	340

Muon R&D: FY01 Beams Div. Request

	M&S (K\$)	Effort (FTE)	Labor (K\$)	SUM (K\$)
Complete Lab G (complete cave, water, interlocks)	30	0.8	68	98
805 Mhz high-power tests	130	1.2	120	250
200 Mhz cavity design	–	1.1	112	112
Travel	50	–	–	50
General operations	50	–	–	50
Total	260	3.1	300	560

MUCOOL–FNAL RF: FY01 Muon Collab. Funds Request

	M&S (K\$)	Effort (FTE)	Labor (K\$)	SUM (K\$)
200 Mhz facility preparation (Install 200 Mhz surplus comp- onents, water, power, interlocks, controls, re–engineering, design layout)	200	3.1	264	464
Begin construction of cave annex (Lab G)	25	0.5	42	67
Test gridded tube concept	55	0.6	51	106
Sub–Total	280	4.2	357	637
G&A	70	–	89	159
Total	350	4.2	446	796

Funding sources for FNAL-based Muon R&D

Source	(K\$)	Comments
Fermilab base program	900	Guideline to execute Directors request
Muon Collaboration funds	~1100	The MUCOOL guideline is 1.6M of which ~0.5M needs to be spent on activities outside of FNAL
University consortium (State funds)	2250	Proposal approved (needs to be rubber stamped). Mostly for University salaries.
US–Japan Funds	~10	New MUCOOL piece ... this is a seed that can grow in FY02 !
NSF	O(100)	Proposal stage ... may take some of excess pressure off MC funding with future growth potential

FNAL-based Muon R&D: FY01 Requests Summary

	M&S (K\$)	Effort (FTE)	Labor (K\$)	SUM (K\$)
Fermilab – BD	260	3.1	300	560
Fermilab – PPD	196	1.7	144	340
State Funding – absorber R&D	336	0.3	28	364
Muon Collaboration Funds – RF	350	4.2	446	796
Muon Collaboration Funds – other (and/or NSF support)	193	1.0	113	306
US–Japan Funds	10	–	–	10
Sub–Total	1345	10.3	1031	2376
State Funding – university salaries	–	–	1886	1886
Total	1345	10.3	2917	4262

Muon R&D: Additional things we would really like to do !

	M&S (K\$)	Effort (FTE)	Labor (K\$)	SUM (K\$)
Further 200 Mhz installation (tetrode, power supplies, drive amplifier & low-level electronics, cave, water, interlocks)	325	1.5	200*)	525
200 Mhz body spinning test	45	0.5	43*)	88
Solenoid for 200 Mhz setup (design & material purchase)	830	0.4	34**)	864
Total	1200	2.4	277	1477

*) BD effort **) TD effort

Muon R&D: NOTES

1. Guideline is \$900K. This is enough to prepare a LH2 test area and complete 805 Mhz program. It is not enough to pay scientist salaries, or begin to prepare a 200 Mhz test area.
2. With State support (proposal already approved) will have enough to pursue the LH2 absorber R&D in FY01.
3. With MC funds (presently uncertain) will have enough (\$796K) to support a **MINIMAL** 200 MHZ test preparation activity. If MC funds are not forthcoming, will need an additional \$796K from the lab to make any worthwhile progress on the 200 Mhz test preparation.
4. To **FULLY** support the 200 Mhz preparation requires an additional \$1477K.
5. The base program support is heavily leveraged ... **non-base program funding = \$3362K.** A MARGINAL PROGRAM IS NOT IN OUR BEST INTERSTS ... **WE NEED TO DELIVER !**