



NuMI Target Hall Status / Plan

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- 8 slide introduction to target hall
 - 9 slide list of status and what remains to be done

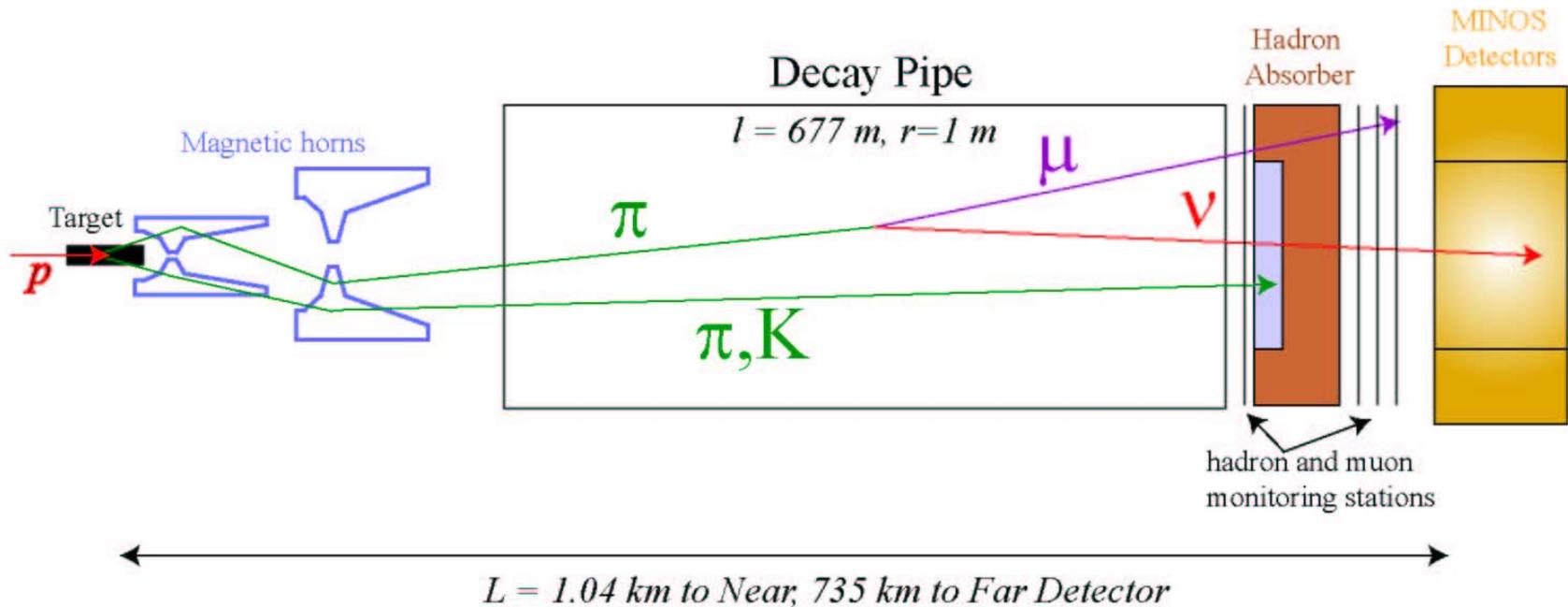


How ν beam is produced

120 GeV/c protons strike graphite target

Magnetic horns focus charged mesons (pions and kaons)

Pions and kaons decay giving neutrinos





NuMI Target Hall comparisons

Want 70% - 80% of protons that M.I. produces.

Like AP0, but several times more beam, on larger objects, on a slope

(~ 8 x more beam power than Mini-Boone, beam heating is larger issue)

Recent Pbar production – 5 e12 every 3 seconds

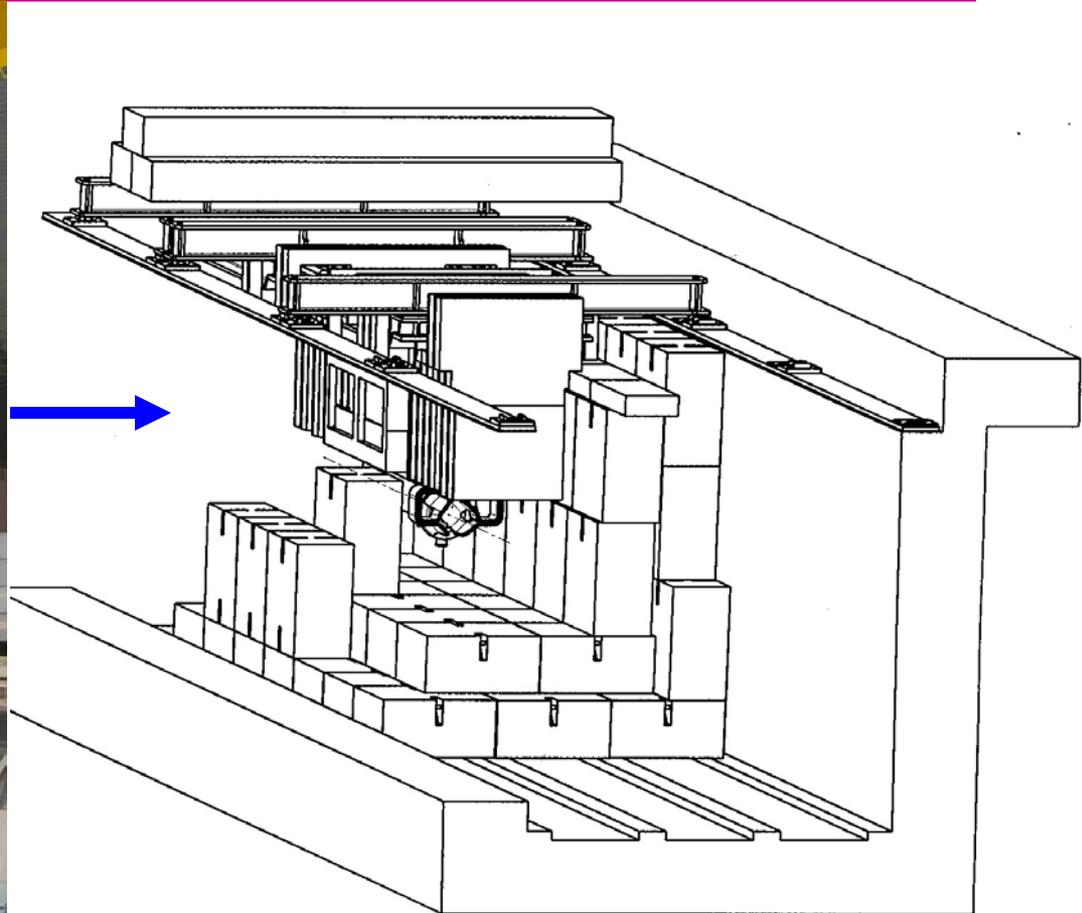
NuMI startup - 25 e12 every 2 seconds *(about half of design)*

AP0 Lithium lens about 1' long

Each NuMI horn about 13' long

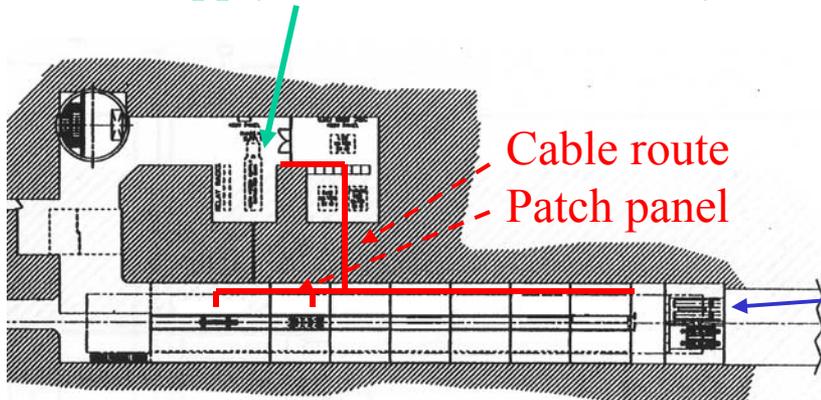


Horns and target hang from support modules behind ~ 2 m thick steel shielding



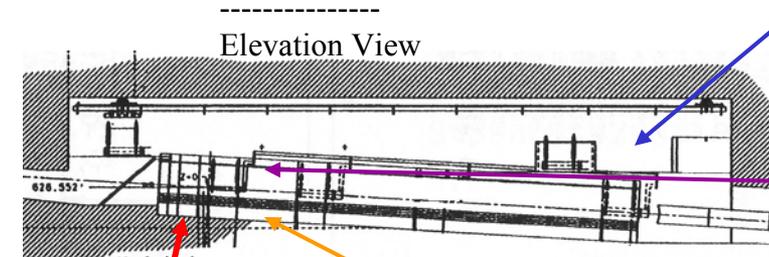
Radiation Dose

Power Supply Room: $\sim 1 - 10$ Rad/yr (MADC, differential pressure sensor, ...)



Plan View

Target Hall above concrete covers:
 $\sim 10^2 - 10^4$ Rad/yr
 (hot cell system, air recirculation system, humidity sensors)



Elevation View

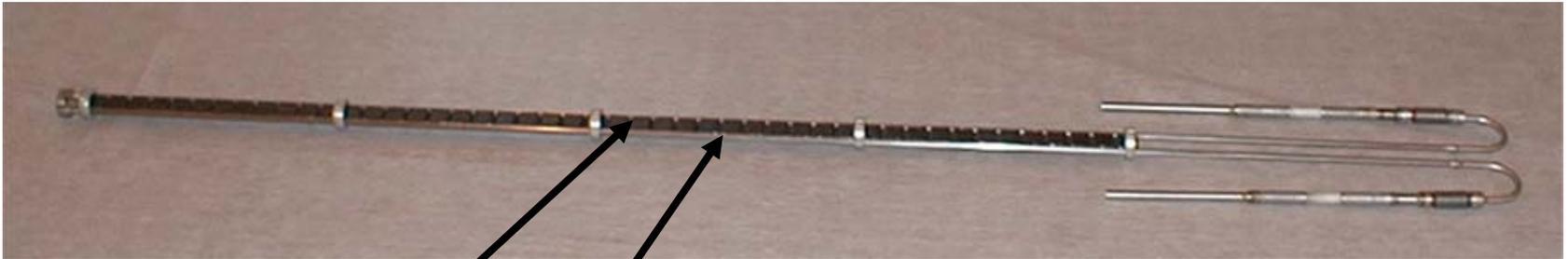
Top of module, under concrete cover:
 $\sim 10^4 - 10^5$ Rad/yr
 (motors, LVDTs, limit switches)

Center of target:
 3×10^{14} Rad/yr

Chase, around horns: $\sim 10^{10} - 10^{11}$ Rad/yr
 (thermocouples, bdot coils, BLM ionization chamber)



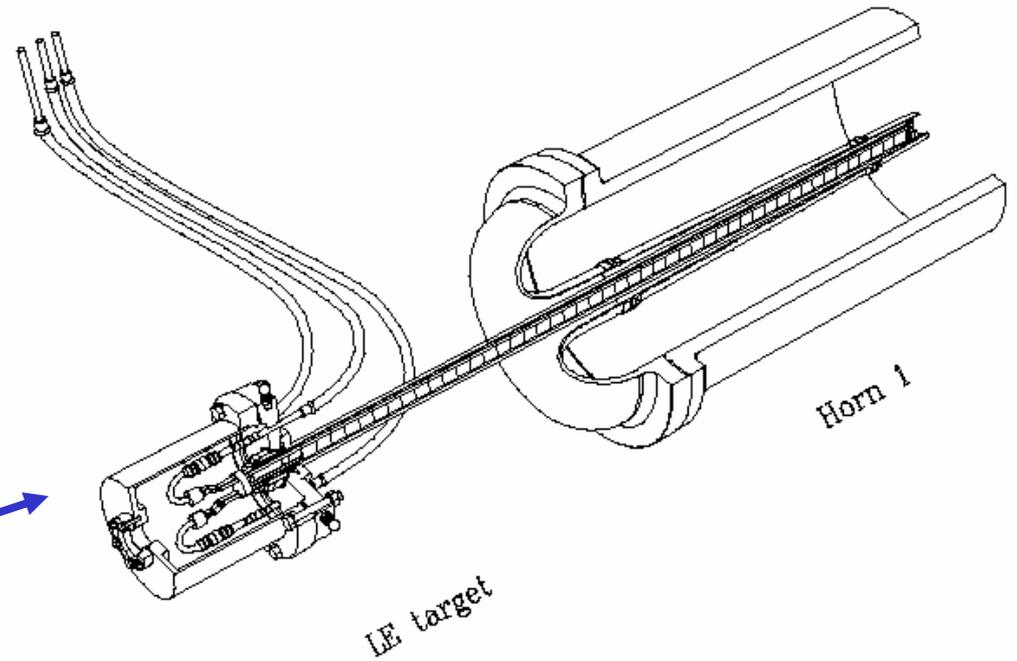
Target



Graphite Fin Core
2 int. len.

Water cooling tube
provides mechanical support

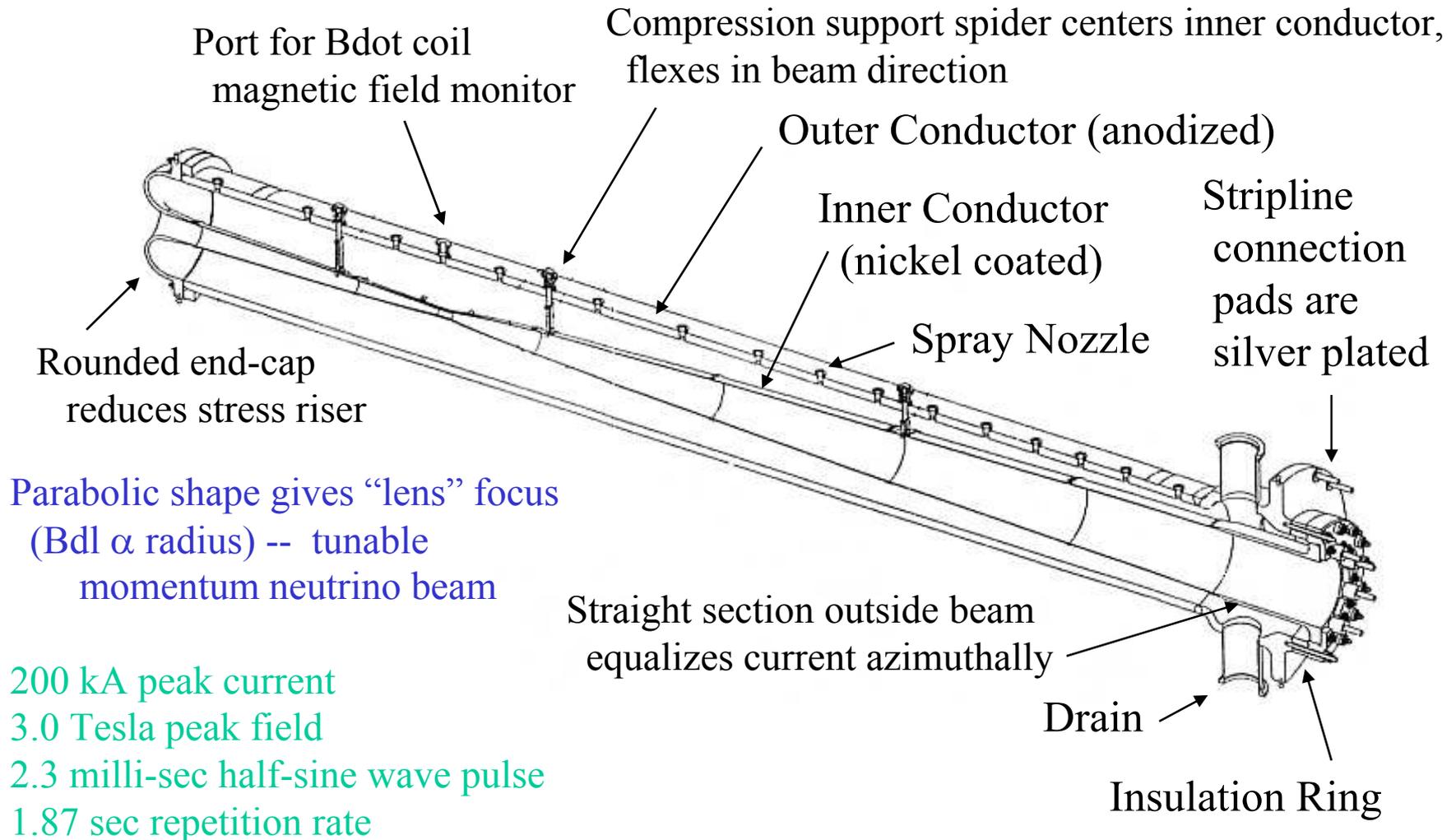
Low Energy Target fits in horn
without touching





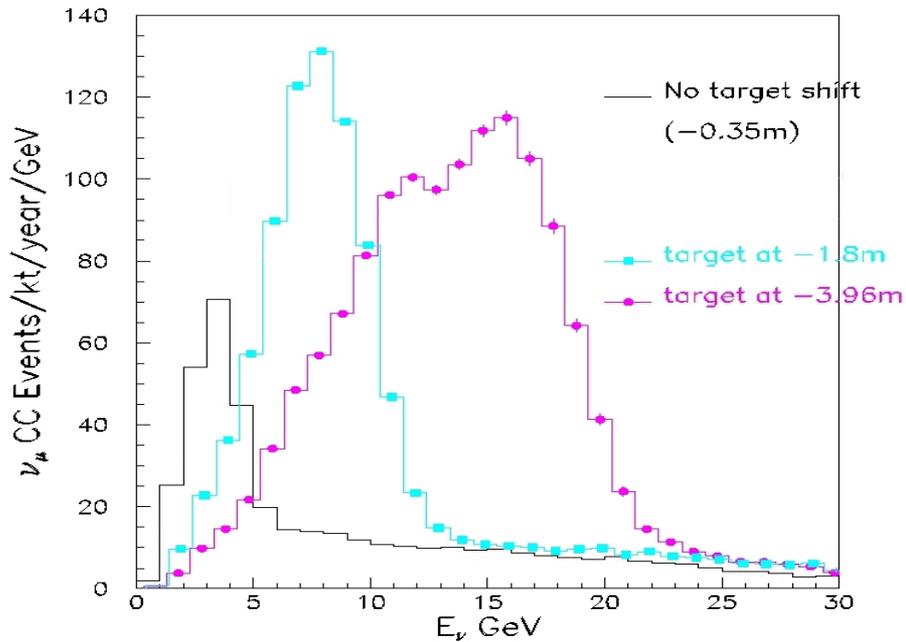
NuMI Horn

General Design Features





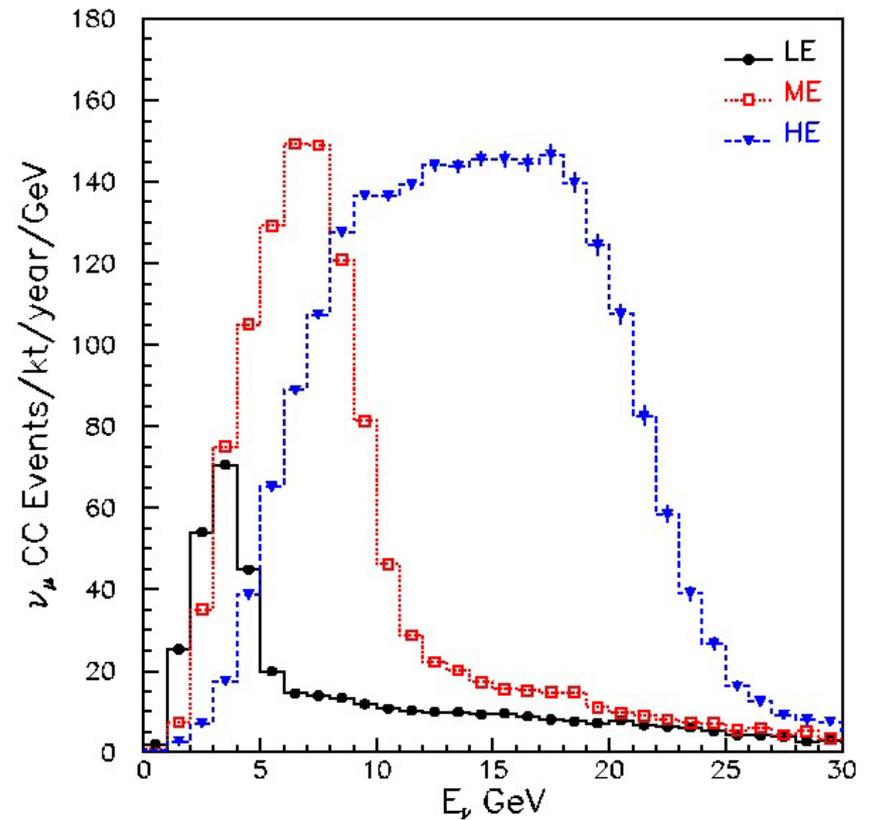
Reasonable High Energy beam can be produced by just moving LE target



“Semi-beams”

Just moving LE target

-can do at touch of button !



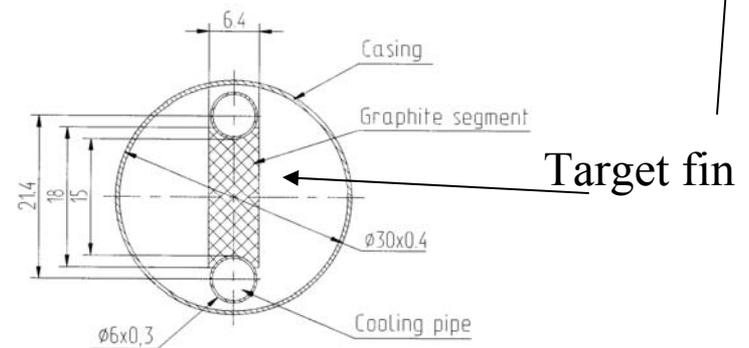
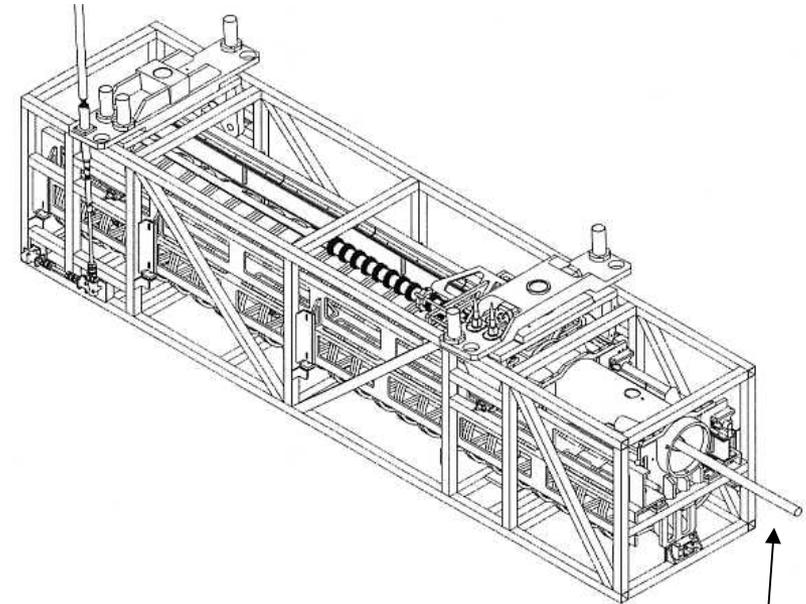
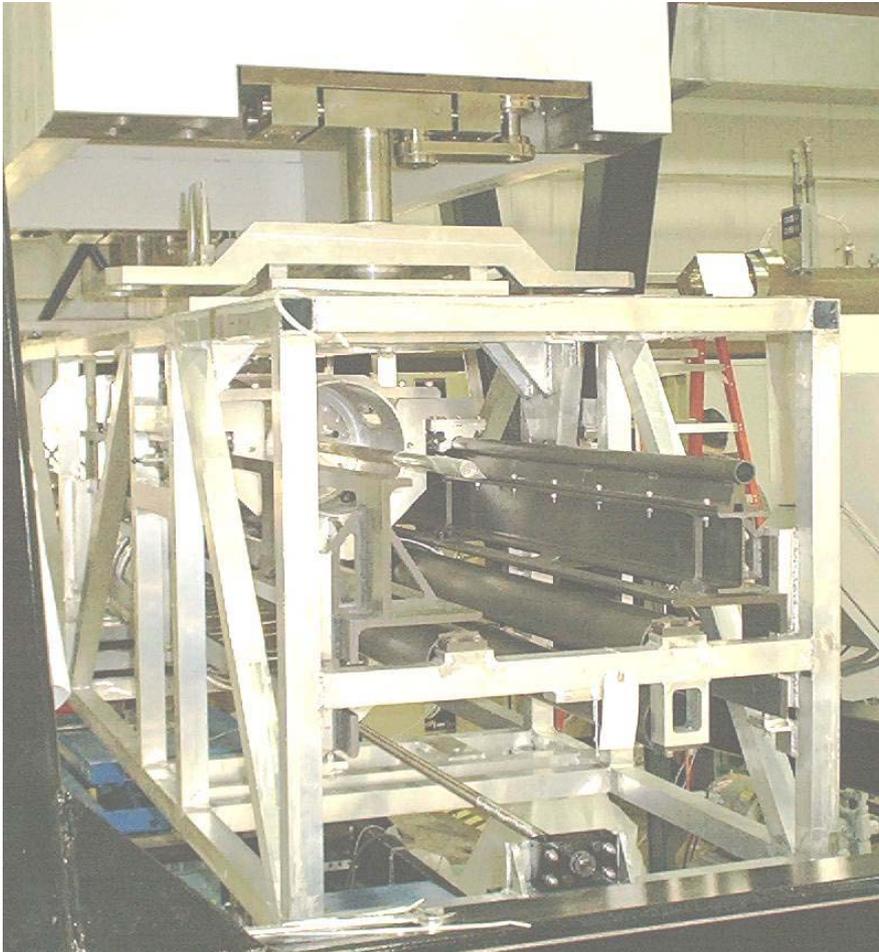
Full Beams

New target, move horn 2



Target/Baffle carrier

moves target by 2.5 m to change beam energy





NuMI Target Hall shielding status

Run II meeting
Nov. 4, 2004
NuMI Target Hall
Jim Hylan
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Target in place

Horns in place

Utilities connected

Remaining shielding:

- 1) one layer concrete block cover
(after horn testing)
- 2) Main shield door
(base being poured)

Need platform to
remove crane electronics

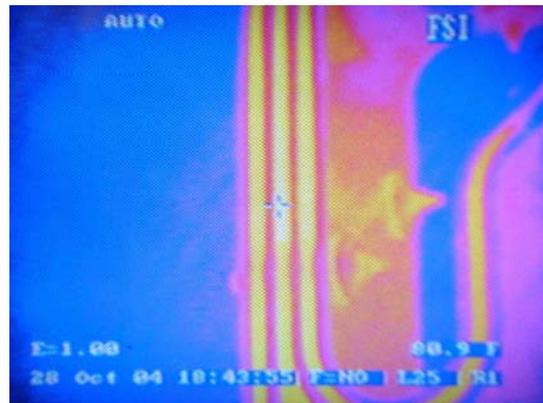


Horn system status

Have run horns at full power under computer control (last night).

(THANKS TO MANY PEOPLE !)

Have finished most of vibration measurements, thermal scans – looks good!



To do:

Finish implementation of data logging of instrumentation

Add automatic shutoff valve to RAW, so can run unattended

Put larger pumps on RAW before real beam running

Reject common-mode noise on two of six Bdot monitoring coils

Horn 1 final alignment using motor drive



Target system status

Target is aligned to carrier rails, and is in target hall; RAW system worked

To do:

Re-commission motor drives in target hall

Survey of target to carrier tooling balls (in work cell – *December?*)

Install target's Helium/Vacuum system

(control valve + controller on order)

Checkout of thermocouples and Budal monitor

Final survey after hot handling tests (*mid-January?*)



Work cell for radioactivated components: *Installation in target hall is finished*



In New Muon before installation
and without lead-glass windows



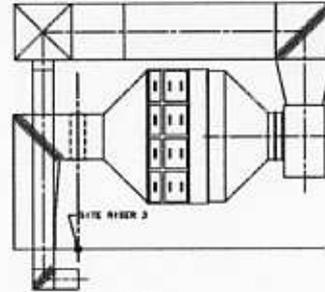
In target hall, with remote lift tables,
in use



Re-circulating air system

regulate air temperature, humidity around horns

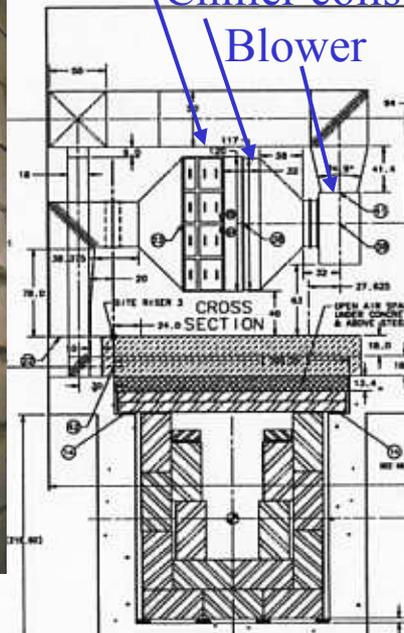
OUTLOOK: commissioned around Christmas



Filters

Chiller coils

Blower



26,000 cfm air flow

240 kW of cooling

for spec. 158 kW beam heating

18 mph wind in beam channel

100 hp fan motor

Chiller still on order – late Nov. deliv.





Hot Handling Practice

Test horn/target replacement procedures before irradiating modules and target pile –

- components and modules will eventually be several hundred R/hr

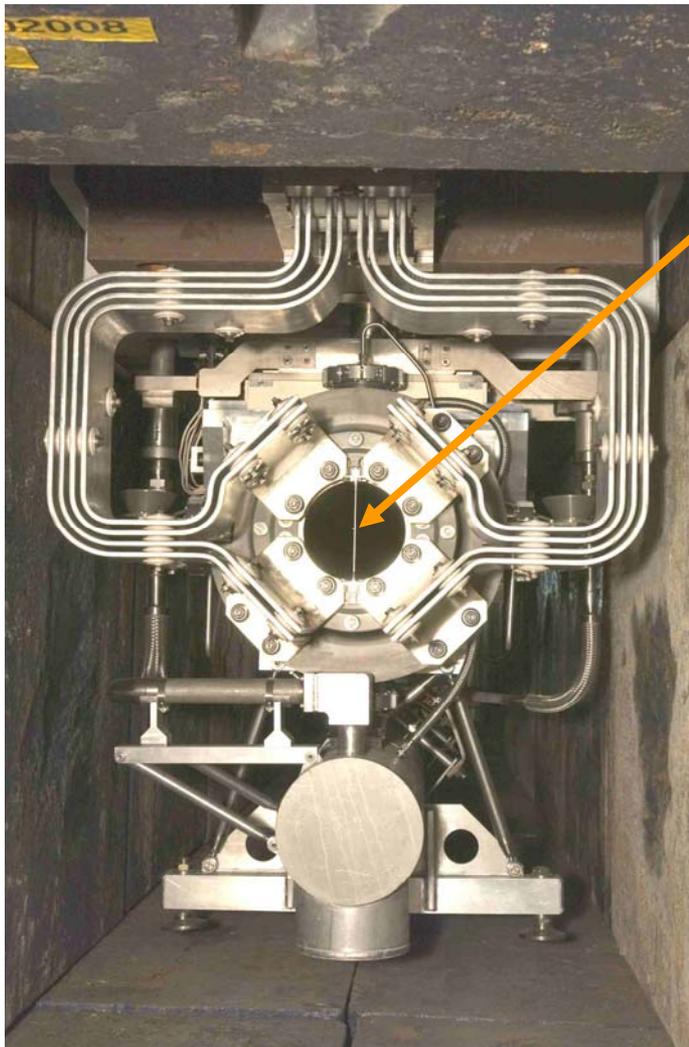
Must remove/replace shielding and modules remotely



camera system well under way

Estimate 40 shifts for hot handling practice. Will start mid-November, progress will be limited by interference with air system installation/checkout

Beam/horn alignment check



With target out,
proton beam scan across “cross-hair”
scatters radiation into Rad-hard mounted BLM



Assembly underway in MI-8

Pulse integrator under construction (ANL)

Plan to install / check out by Dec 3.



Instrumentation

~ 100 channels of instrumentation need to be checked out

horn current monitoring

horn field monitoring

thermocouples

target Budal

cross-hair ionization chambers

horn/target motor drives

air-system monitoring

target pressure

Range from essentially done to not ordered yet.

*Much of this being done or coordinated by Argonne National Lab people,
but A/D support groups have been good to us*



Spares status

Spare target constructed (will be used in e907 temporarily)

Spare baffle constructed

Must have spare target carrier to make above useful !

must modify drawing set before starting construction

high priority, may take ~ six months

Working on horn 1 and horn 2 spares

-- new Horn 1 (*August?*)

Prototype horn would need outer conductor cooling, clamps,

remote-water/electrical-connections, stripline bayonette to be spare

-- Horn 2 (*November?*)

Spare remote stripline clamp under construction (*six months?*)

Need to re-build horn testing area - new field probes, reconnect test power supply