

# Task list for MIPP upgrade experiment

Nickolas Solomey

This presentation concentrates on the nuts & bolts of the MIPP-upgrade project under the assumption that it is approved and funded, then what do we need to do.

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# Status

- For the MIPP upgrade experiment we have to identify:
  - Prioritized task list.
  - Who will do each task, and physicists overseeing it.
  - How long will it take.
  - Where will each task be funded from.
- To answer the first point we have to know what our physics goals of the MIPP upgrade are?
  - NuMI target improved statistics and future NOvA new target study.
  - pion and kaon production cross section on Liquid Nitrogen for atmospheric neutrino experiments.
  - Scaling law extension run for neutron target (i.e. uses Liquid Deuterium target), and for 2 particle inclusive productions (using higher rate of TPC for more events).

# continued physics case:

- World sample of medium energy anti-proton on H or D, p-D interactions etc., could use a back-scattering detector upstream of target.
- Improve charged kaon mass measurements by RICH ring dia.
- Obtain 5 million events each on 30 nuclei with beam energy from 1 to 120 GeV/c for purposes of improving hadron shower simulation models, **important for ILC calorimetry R&D.**
- Extending the beam energy down to 1 GeV/c will facilitate the study of missing baryon and cascade resonances.

# Possible MIPP-upgrade Tasks:

- TPC upgrade
  - New readout electronics
  - Restring wire planes
- Repair JGG magnet
- Repair hot wire in DC4
- Replace MWPC 5 with spare
- BC, DC, MWPC electronics upgrade
- New Wire chamber HV
- Larger Veto wall
- 9 dead channels (PMT or ADC) in DCkov.
- Change slow readout TDC with Fera
- Fix beam ID TOF, so it can be used in trigger
- Fix MC6D magnet short
- Improved O2 monitor for TPC gas.
- Silicon trigger
- Improve beam <10 GeV

# Task comments:

- Some tasks are simple and can be easily done, such as DC4 hot wire fix, or a larger Veto wall where the parts exits from old fixed target experiments.
- Other tasks just need a purchase order such as O2 monitor.
- Some tasks such as fixing analysis magnet coil or replacing MC6D are engineering support at Fermilab.
- Other task such as TPC or Wire Chamber electronics are the Fermilab electronics shop. However; they need a partial/full time person to make sure it comes out correct.

# Task breakdown:

<u>Task</u>		equipment	manpower	cost	priority	
TPC:	electronics	buy	e-shop	~80000\$	highest	needs a partial physicists to ove
	re-wire	in house	Lab 6 + Physics		high	
	O2 monitor	buy	test and setup	small	good idea	
JGG		buy	FNAL support	~180000\$	highest	
MC6D		move	BD support	manpower	highest	
BC, DC, MWPC	electronics	buy	e-shop	~50000\$	high	needs a particle physicists to ove
	Fix DC4	in house	Lab 6		good idea	
	replace WC 5	in house	Lab 6		good idea	
Dckov	repair dead channel	in house	University	student work	good idea	
	Faster readout TDC	in house	University		good idea	
TOF	Faster readout TDC	in house	University		good idea	
Veto Wall	equipment exists	in house	University	student work	necessary	improves events for physics
Si Interaction trig		FNAL has??		need expert	better trigger	
CAEN HV		move	University	student work	low cost	improvement
Beam TOF trig			e-shop ?		high	when running < 10 GeV/c beams
Improve < 10 GeV/c beam		buy	BD in house	small parts	highest	when running <10 GeV/c beam
New PCs (5) and 500 Gbytes disk		buy		~10000		
DAQ			University			
Trigger re-design		Prep	FNAL support			

# Time line:

- Long lead-time tasks:

- JGG coil
- TPC electronics
- BC, DC and MWPC electronics

6 months onces started, then  
3 months to install and debug

These tasks also are the main expense of the upgrade project

- Medium projects:

- Bigger veto wall
- Si Interaction trigger

- Smaller projects have a shorter time scale, well suited for University groups to lead.

# Conclusion:

- Tasks are all manageable in the sense we know what to do and have the expertise to handle it well.
- Need to get FNAL approval for the upgrade MIPP run and funding before the green light to start appears.
- If each group took on one major task or a few of the small task we could oversee these projects with the smallest impact upon everyones time!