Some Efforts at FTBF
Selected Short Subjects
Quick Overview
Mostly – Work in Progress

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Overview

• Running overview of 2011, so far in 2012
• Simulation work in progress
• MCenter plans
• Tertiary Beam comments
Running Modes

• Counting **days when beam is delivered** is appropriate for FTBF as experimenters have very different rate needs – few 100 / spill to maximum possible ( ~ 300 K particles / spill )

• Usually – one 4 sec spill each super-cycle ( ~1 minute ) Other possibilities have been developed, but have not been requested by experimenters.

• There may be more than one experiment taking data. (But double no double counting of days here)
In 2011 there were 270 days when beam was delivered based on f:mtest, close to f:mt6sc1.
Number of protons sent to FTBF

( f:f1sem )
So Far in 2012
Note: recent running 24 hrs/day with SeaQuest
Simulation Efforts on-going g4beamline and of course transport ...

Many useful discussions with Rick Coleman

- Explore beam loss, collimation, decays...
  Much more to do.
- In the figure below, transverse dims. *10
- **Light green – Quad, Dark Green – Dipole, Red – collimator**
- Ideal beam – no decays, multiple scattering
μ⁺ ‘beam’ 737 μ⁺ / 20K π⁺ = 3.6%

32 GeV/c π beam, ~50 m decay length (final bend to MT6)

The muon beam – 3 m of Fe absorber (μ filter) in the π beam.

there may be an enhancement at high p – far upstream decays ~60 μ⁺
muon rate is about as expected from a simple estimate.
Momentum dispersion
Momentum in MeV/c, nominally 12. x in mm

At Experiments –MT6

At momentum Collimator
Beam phase space at FTBF
for 16 GeV/c $\pi^+$ units are mm, radians

at MT6
Add multiple scattering, $\pi$ decay

2 GeV/c, Cerenkov counter effects not included
May also use Transport
very preliminary

Beam divergence $\sim 3 - 4 \text{ mr}$
Cerenkov angles $\sim 5 - 10 \text{ mr}$

More tuning needed
Spill structure

Left – Old; Right - Now

Also problems on faster scale??

Usual Beam Spill Structure: 4 sec every Minute, 12 hr/day
Other spill structures possible, not requested
Additional Test Beam Space

• The current FTBF facility is heavily utilized.
• Plan to add MCenter as a test beam facility
  – previously the MIPP beam line
• 5 – 80 GeV/c + or -, Cerenkov particle ID
• May configure for low intensity protons.
• May extend momentum down to 1 GeV/c
• Technical installation is complete – awaiting final Shielding Assessment – thanks Tom Kobilarcik
MCenter area for experimenters
much work by Todd Nebel et. al.

Upstream end of MC7
Space on the floor
Space on a stand (with a walkway)
Further downstream
MIPP beam line
JGG
more MIPP
Jolly Green Giant

• Experimenters may have need of a magnetic field in which to study detectors.
• JGG has been refurbished. (longer poles, new coils) – Jim Kilmer ...
• Ziptrack has been refurbished
  – (Carl Lindenmeyer, Mike Roman)
  – New optical encoder for ‘z’
  – LabView Software (Jerry Zimmerman)
Refurbished JGG with Ziptrack
much by Jim Kilmer et. al.
EDIT 2012 school  Feb 13-24, 2012
Excellence in Detector and Instrumentation Technologies

• Many parts of the Lab were involved
• Erik and Aria put together a nice package at FTBF
• Learn about detectors on 1 day
  – Pmt’s, Logic, MWPC, gem, ...
• Do a test beam experiment the next!
  connect cables, debug logic system
  connect to DAQ, get & look at data

Big hit with the students!
Study differential Cerenkov counter rates in the inner and outer vs pressure

Group 1 Data
positive beam

Group 2 data
negative beam
Tertiary Spectrometer

- Used by Minerva (HyperCP chambers)
- Recently – difficulty with CAMAC, Fenker chambers.
- Updating – front end amp (works!), and disc., readout
Tertiary Pion Beam
For one incident $\pi^+$ beam pulse (300K)

$\Pi^+$

And some protons
Minerva preliminary results

Preliminary TOF and Momentum distributions (June 7-27 runs)
And ...

- Planning to do more detailed comparisons of beam and simulations – rates, beam properties, modes
- More detailed Cerenkov studies
- Upgrades of chambers for secondary (FTBF in MWest and MCenter) and tertiary beams.
  
  . . . and . . .

- Of course – users, users, users!
Extra
Overall Layout

Meson Bldg.

MCenter
former MIPP