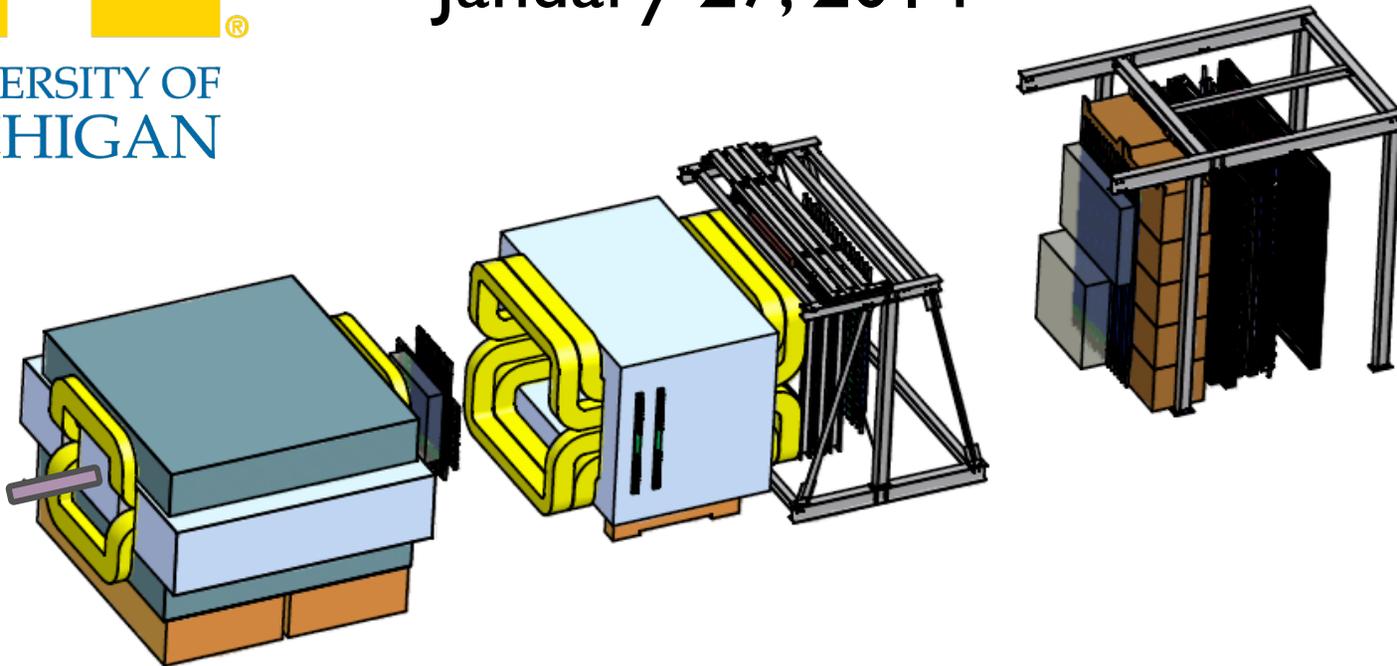


SeaQuest AEM Report

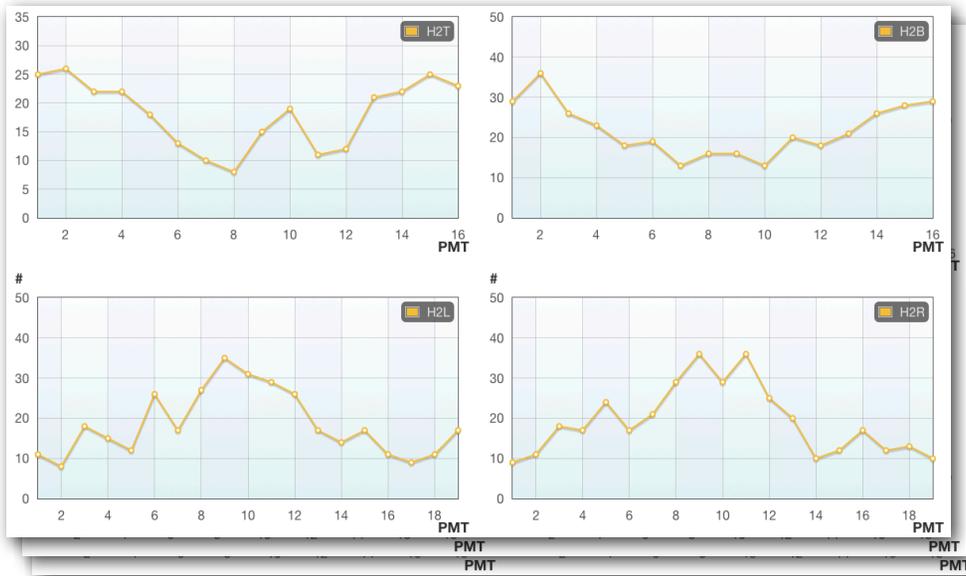


Joshua G. Rubin
January 27, 2014

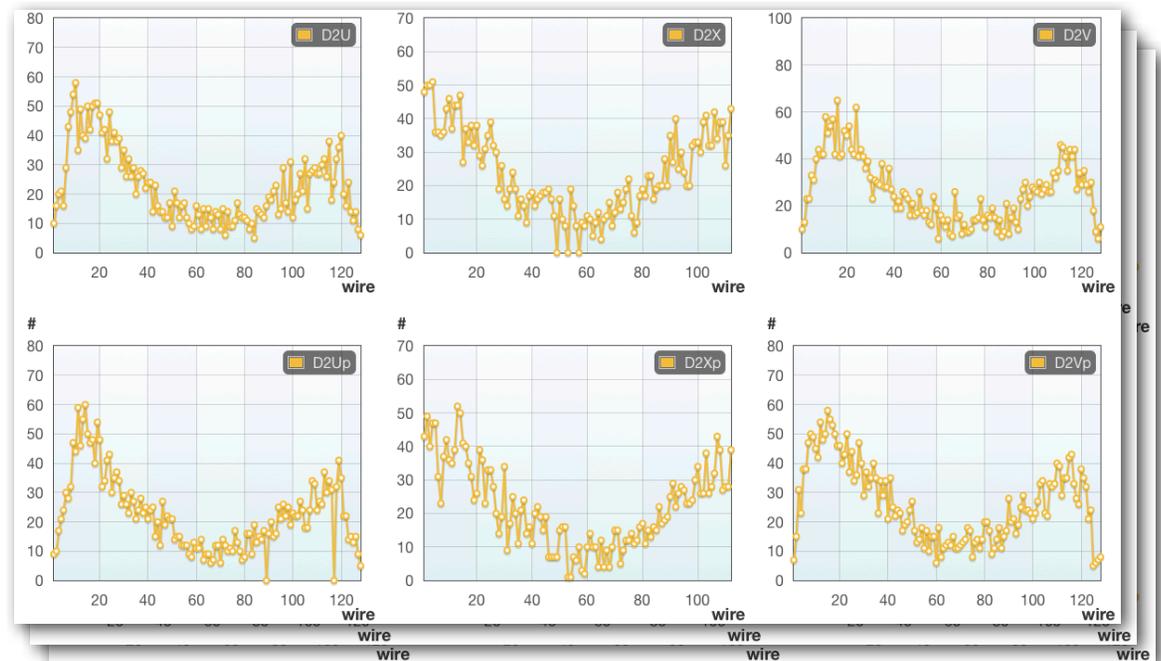
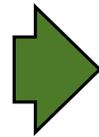


Detector

Trigger hodoscopes
precisely timed-in and
operating efficiently
requiring very few
service accesses.

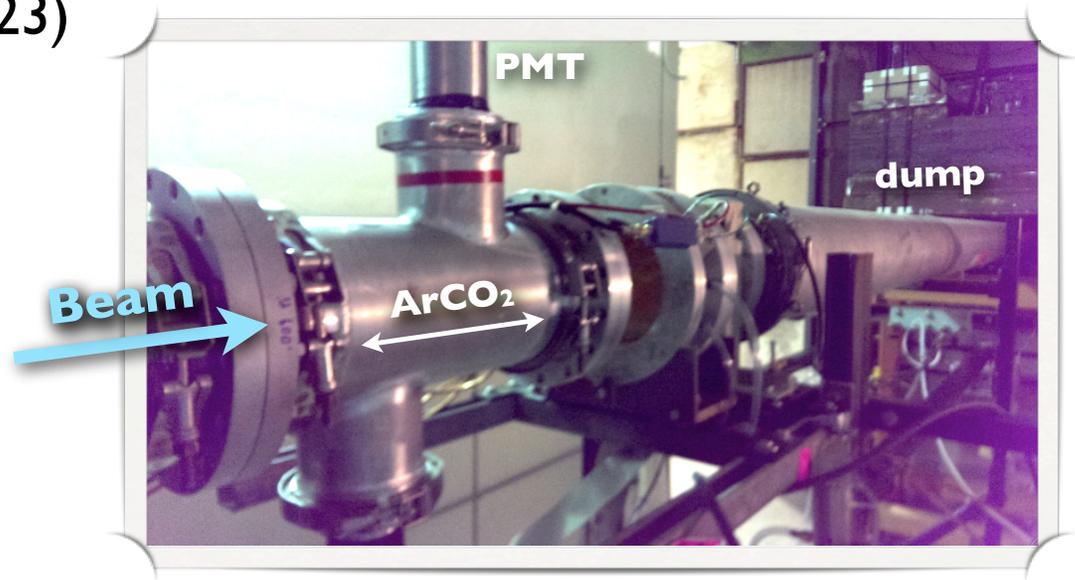


Drift chambers
and proportional
tubes showing
high efficiencies
and operating at
nominal voltage
levels.



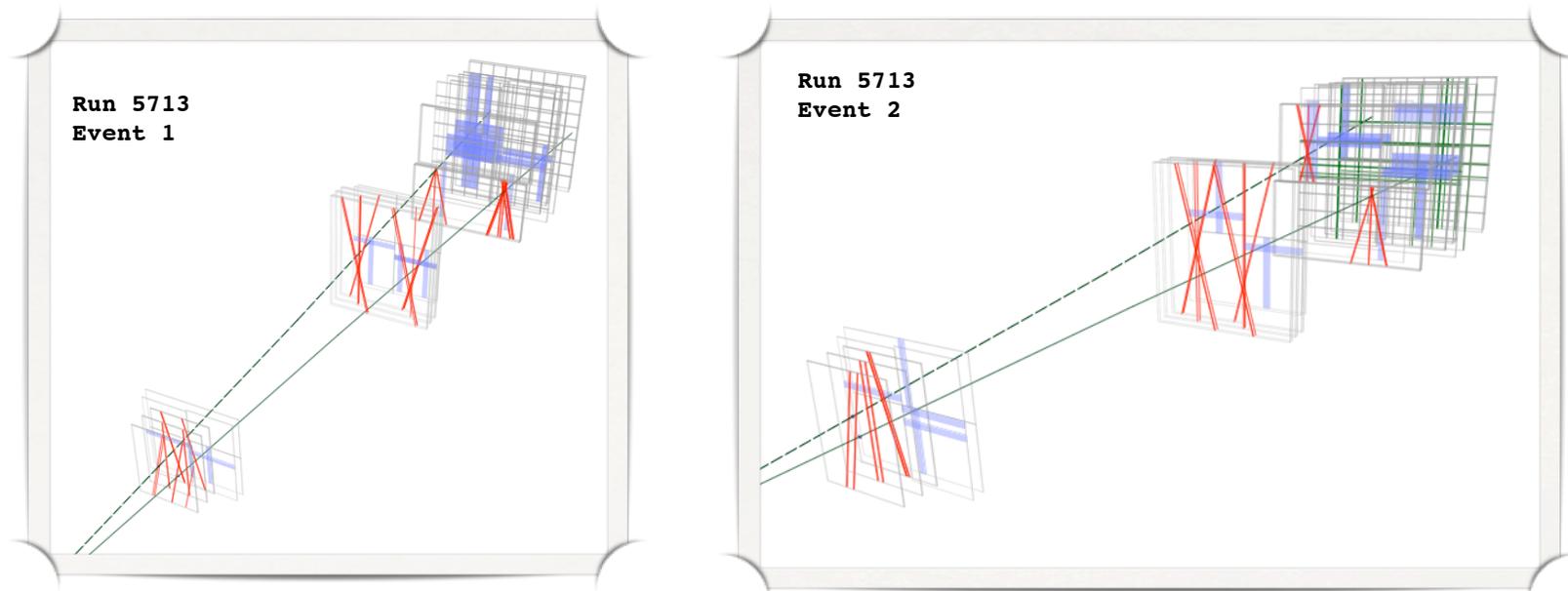
Radiation Levels in NM4

- ▶ In December, rad monitor trips were observed in NM4 (SeaQuest hall) at beam currents exceeding 3E11/spill. (1E13/spill is the design value)
- ▶ Cherenkov intensity monitor identified probable culprit
- ▶ Tested by replacing Cherenkov monitor (Jan. 8) with vacuum pipe - radiation levels dropped
- ▶ Shorter monitor constructed and installed further downstream (closer to iron dump) last Thursday (Jan. 23)
- ▶ Waiting on final word, but we expect that this will solve the problem and permit full design intensity



Cherenkov Monitor

- ▶ New beamline position is closer to readout board and provides a cleaner signal.
- ▶ Multiple network adaptors now provide bucket-by-bucket readout of full spill (formerly one adapter provided about two seconds).
- ▶ Luminosity counters implemented. i.e. board reports un-vetoed intensity per spill.
- ▶ Microcode simplified: vetoes now on single RF bucket above selectable intensity for selectable time. We can “dial-in” intervals of desired beam intensity (in exchange for total luminosity). See low intensity events below:



Trigger

Significant work is ongoing to debug and optimize the SeaQuest trigger system. Issues:

- The diagnostic (NIM) trigger has been shown to have inconsistent rates with the production (FPGA) trigger. *This may be caused by the summed discriminator output used to form the NIM logic.*
- Production trigger sometimes inconsistent <10% with recorded event data.
- Production trigger road lists and conditions being optimized for high-mass dimuon kinematics + accidental background rejection.

Summary

- Detector components working very well
- Elevated radiation level problem understood and likely fixed – won't limit integrated beam intensity
- Cherenkov monitor measuring bucket-by-bucket beam intensity for complete spill, vetoing, and recording lumi.
- Major push ongoing to resolve trigger issues – last hurdle before “production data”
- Continued effort from AD necessary to improve beam duty factor