

Procurement, Schedule, Installation, Manpower and Meetings

Douglas Hasell, December 4, 2022

Procurement

- A lot of things have been done but a lot more still needs to happen
 - Permanent magnet quadrupoles have been ordered (delivery ~March, 2023)
 - Target ladder exists at TRIUMF
 - Spectrometer magnet design in reasonable shape but need to finalize
 - GEM detectors mostly exist but mechanics and electronics need work
 - Trigger scintillator mostly exist but mechanics and details needed
- A lot of details need to be managed

Procedure

- For each item
 - Finalize design
 - Everyone (collaboration, TRIUMF, etc.) must sign-off on design
 - Order components, machine, assemble, etc.
 - Test
 - Ship to TRIUMF (export/custom duties)
 - Receipt at TRIUMF
 - Installation on experiment
 - Cable and test

Scattering chamber

- Design is straight forward but **need to finalize angle**
 - 14 inch diameter !!! ??? - position of first PMQ ?
 - Vacuum pumps ? Vacuum gauges ?
 - Support frame
 - Get approval
- Send out for manufacture
- Can not weld exit beam line until first PMQ delivered
- Assemble and vacuum test at Bates

Spectrometer magnets

- Design in reasonable shape
- Meeting on Wednesday to outline what still needs to be done
 - Safety requirements for cable junction (wrapped, boxed ?)
 - Alignment features
 - Support stand
- Hope to start ordering before Christmas

Probably the longest lead-time item for the experiment

- Test at Bates

GEM Detectors

- GEMs basically exist
 - Need to test
- Need drawings including electronics and cabling requirements
 - Will you remake adaptor board ?
 - Shift GEMs wrt each other to allow 90 degree cabling
- Support ?
 - Position and alignment features

Trigger scintillator

- Design mostly complete
- Components delivered and/or ordered
 - Additional bars ?
- Assemble and test at TRIUMF
- Need drawings
 - Support and alignment

Shielding

- Propose having a plate at the height of the dipole magnet top
- Details of shielding pending tests, Monte Carlo, and FLUKA results

Infrastructure

- Cabling
 - How long? To where?
 - Shielded area for electronics in e-hall?
 - Counting room (outside?, on roof?)
- Gas lines
 - Local to e-hall or remote
 - Monitoring and control - Michael

Crane

- Kate - can you investigate existing crane?
 - Capacity, range
- Dipole magnets around 1500 pounds
 - Probably need 2 t capacity for safety

Schedule

- Like installation in June or July, 2023
- Aim for everything to be at TRIUMF in May, 2023
- Likely will only be allowed to break the vacuum once !
- Vacuum components will need to be cleaned at TRIUMF in advance

Installation

- Scattering chamber, target ladder, pumps, beam line, quadrupoles go in first
 - Then position and align everything
- Add positron dipole magnet
 - Position and align
 - Cable and test
- Install electron dipole magnet
 - Position and align
 - Cable and test

- Start vacuum system
 - Ensure everything pumps down
- Install GEM detectors
 - Position and align
 - Cable and connect gas
 - Test
- Install trigger scintillators
 - Position and align
 - Cable and test
- Install shielding

Timeline

- 1 week for scattering chamber and beam line elements
 - Including survey
- 1 week for each dipole
 - Including survey, cabling, and testing
- Likely another week for vacuum tests
- Everything else can be during access periods if no dedicated time available

Manpower

- Suggest MIT-Bates sends
 - Engineer and a technician
 - Graduate students and post-docs as needed
- Hampton responsible for GEM installation, etc.
 - Michael, graduate students, post-docs
- UBC, UM, UW, SM responsible for trigger scintillator
 - Mike, Wouter, Jeff, Rita, et al
- SBU responsible for electronics and data acquisition
 - Jan, graduate students, post-docs

- Need TRIUMF survey group at critical points
- Need TRIUMF vacuum group to approve everything and start pumping
- Every group needs to bring the manpower, equipment, and tools needed
 - Don't assume fittings, wrenches, soldering irons, etc. are available

Bureaucracy

- Need formal letter of cooperation, agreement, memorandum of understanding
- Kate ?
- Need to investigate export and customs regulations to avoid excess charges

Meetings

- Lake Louise
 - Someone from Canada should go skiing
- Hawaii
 - We should all go but maybe realistically 1-2
 - Or organise a concurrent Dark Matter workshop ?
- Next collaboration meeting should be in May, 2023, at TRIUMF
 - Review status
 - Plan for installation