

## E158 ESA Tasks, Summer/Fall 01 (Draft 1, 6/13/01)

Here is a summary of tasks that impact ESA activities during the summer/fall 01. This first pass was created by KK and Steve. Immediately after the collaboration meeting, the list will be maintained by Ken and Steve. Our goal is to use this list to prioritize and organize the work, estimate the resources required and assign physicist manpower. No modifications are envisioned for the area between scattering chamber and 3QC1A. Any proposed activity in this area must be considered absolutely essential before being undertaken since one is dealing with a contaminated area.

- **A-line Skew Quads:** Mike Woods is looking into converting the quads (unspecified) to skew quads. This requires coordination and resources with Roger Erickson/Tech Division.
- **Leak fixes:** in 3BPM2, bellows between 3D1 and 3D2, 3D2 and 3D3 if possible.
- **Target/Scattering chamber:** This activity is coordinated by John Weisend. The request from the collaboration is to inspect the inside of the target loop and attempt to establish a reason for the peculiar behavior on cooldown.
- **3DC3 realignment:** This may need boresighting in which case it becomes a major undertaking, particularly if the radiation levels remain high. Jim Allan will be asked to monitor the beamline/spectrometer periodically and establish a decay curve. If this activity can be done when 3BPM2 is removed to fix the vacuum leak, then it might not require extensive disassembly of alcove beamline.
- **3QC1A alignment:** Current alignment numbers are considered insufficient for the physics measurements envisioned for this collimator. Working on 3QC1A requires careful planning since parts of 3QC1B are likely to be quite radioactive.
- **3QC3 to be deferred:** It is hoped to achieve the final systematic error on polarimetry without the cross-over optics, which required this collimator. This issue might be revisited after the next run.
- **3RC1 to be eliminated.** 3RC1 is estimated to cost up to \$250k in its current form and will therefore be eliminated since an equivalent device outside the vacuum can do the job.
- **New rotating collimator:** It is therefore proposed to replace 3RC1 with a similar device outside of the vacuum and just downstream of 3W1. There is 18 to 22 inches of space before the UMass wheel. This new RC would consist of two interlocking half cylinders (no direct field of view), rotatable remotely or locally as required, with the appropriate apertures and removable from the beam. It might need a separate cart or may be mounted on fixed (crane removable) support. The OD (ID fixed by vacuum pipe), length, holes, preferred material must be specified as soon as possible, along with conceptual design.
- **New downstream collimators:** A total of four new collimators will be added downstream of 3QC1B to shield from one bounce spray from 3DC3 and the inner edge of 3QC1B. They will consist of copper pipes at various locations: one likely between 3Q2 and 3Q3, in place of 3QC3, one in the general region of

3RC1, one at the beginning of sewer pipe and one towards the end of the sewer pipe. Typical ID 15 cm, typical OD 20 cm, 30 to 50 cm long, supported on horizontal spokes only. There will be immediate work on analyzing the needs, locations, dimensions and alignment tolerances.

- **Quartz detector modifications:** The PMTs in the quartz detector see significant background. Additional shielding on the PMTs might be required. A plan of action must be formulated immediately, including whether the modifications will take place at UMass or SLAC.
- **Lumi detector modifications:** The Lumi detector exhibits residual noise at the  $5 \times 10^{-4}$  level which appears to be insensitive to the beam. There are two possibilities: either common mode noise, or neutron flux from undetermined source(s). Solutions might be to find the common mode noise, or to reduce Al preradiator and find a way to recover signal strength (such as going down to smaller angles) or design the alternative lumi cherenkov detector with PMTs. A decision on preferred strategy is needed as soon as possible.
- **Electronics noise studies:** A systematic evaluation of common mode and pedestal noise of the detector, BPM, toroid and lumi electronics needs to be carried out.
- **Polarimetry detector:** It has been concluded that a dedicated detector will have to be designed to do polarimetry cleanly. It has to have a relatively small active area ( $\sim 5$  sq. cm), must have vertical motion and will be used in conjunction with the vertical hole in 3QC1A. It should have some of the advantages of the Moller detector (total absorption, shielded PMT) but need not be radiation hard. Immediate work will begin to conceptualize requirements and produce a design with help of engineering/design staff. The detector is to be placed upstream of Møller detector.
- **Redesign/rebuild vacuum pipe/slip joint** between 3VC12, 3VC13. Try to put in bellows since the slip joint leaks and will become a liability during the high power run.
- **Shielding of BDE opening:** The cause of the background in the blinded phototubes is still unknown. It might be prudent to seal off the BDE opening with lead to shield from the Lumi area. This will require engineering as access there is restricted and the crane is not available. Also, is boron-loaded poly required? This design will have to be integrated with proposal to add bellows upstream of 3PR4.
- **Prepare E158 "bed sheet" drawing:** Get engineering/design to prepare accurate "bed sheet" drawing showing physics layers and utility layers on SEPARATE drawings, with accurate station values. The present situation involves many different CAD systems.