

# MERIT Improvement List

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(Feb 8, 2008)

The purpose of this document is to review the installation and operation of the MERIT system at CERN and to provide suggestions for equipment or procedural improvements that will be beneficial should a second run occur. Items for consideration include hardware, sensors, control software, data logging, etc. Equipment installation and setup should be considered along with operations.

## Hg System Improvements/Changes

- Modify magnet support plate to capture solenoid feet to aid in lateral alignment.
- Provide lateral center marks on baseplate as alignment aids.
- Provide means of attaching transporter baseplate to common baseplate to prevent separation during cart transfer. Attachment should include provisions to prevent tipping of the transporter.
- Obtain a more durable secondary bore heater – can a heater be installed on the interior of the snout rather than the exterior?
- Develop better method of powering and controlling the snout heaters – needs to tie into the Labview control system. This will also be a requirement for lead-bismuth operations.
- Issues with some of the RTD temperature sensors – consider replacing them with more durable components. Must consider bulkhead connector at secondary boundary.
- Determine if syringe position creep while HPU running can be alleviated, either mechanically or within the control software.
- Insulate the edge of the nozzle flange – this is a heat leak path from the magnet.
- Replace Hg pressure sensor.
- Obtain spare syringe position sensor in case the two inside the secondary have some unobserved radiation damage.
- Ensure that all moisture is removed from the primary containment.
- Argon/dry Nitrogen secondary environment.
- Heaters inside snout.
- Rotational snout alignment guides.

- Winch system for removal of Hg system while tilted (Oak Ridge operations).
- Replace the nozzle to obtain a true 1-cm diameter jet
- Investigate removal of 180 bend in nozzle piping.

### **Solenoid Improvements/Changes**

- Modify support frame so the leveling screws actually work.
- Refurbish vacuum jacket.
- Modify service end of solenoid.

### **Optical Diagnostic System Improvements/Changes**

- Clean up all messy cables and fibers on and near the electronic rack
- Install new imaging heads on Viewport #1 & 4.
- Replace non-Hg-wet viewports
- Replace SMD camera? We never use the high speed features of the camera because all mechanic dynamics of the jet is still slow. SMD camera does not appear to give us sufficient frame # (limited to 16 frames) to view the full jet dynamics, yet it is placed at viewport 2 to view the center of the interaction
- Streamline data logging of image files for every beam shot

### **Particle Detector System Improvements/Changes**

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### **Beamline Components**

- Alignment improvements?

### **Cryogenic System Improvements/Changes**

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### **Operational Improvements**

- Any communications improvements needed? Control room changes? Additional computers needed? More webcams?
- Supervisory control system to aid in subsequent data analysis and integration.
- Install radiation shield, mostly neutron shield, on the electronic rack at TT2. Protect PCs from neutron radiation damage.

- Interlock all temperature related equipment to prevent temperature overheat and/or cryogenic over-cooling on the primary.