**HyCal tests and refurbishment for the upcoming three experiments in Hall B**

**Goal**: *test/check, repair, refurbish HyCal calorimeter with its all channels to be ready for the gain equalizing and calibration processes with the tagged photon beam in Hall B beamline*

1. Arrange to have enough work area around the HyCal in the current “Environmentally Controlled Building” (#?). Items needed for this work:
2. temporary a few-channel DAQ .
3. temporary HV power supply for one (or few) channels.
4. “Booster” power supply for the PbWO4 crystal part. These are three medium voltage power supply modules and one home-made “block” (from Hall B).
5. The lead-glass “Booster supply” currently does not work, and needs additional work on it.
6. a scope.
7. pulse generator and a low voltage power supply for the LMS system.
8. …
9. Arrange to have all funs in the back part of HyCal operational (just next to the HV dividers and 11 vertical panels. Very important for the heat removal, safety issue). Just connect to the available power outlet.
10. **Prepare/make a new adapter** for the anode signal connection on the top of HyCal. This should be a “male” type connector going to the HyCal top “non-standard” multichannel “female” type of connector (I guess 32-channels). The other side of this “adopter” should end with “female” lemo connectors to be able to connect to anode signals. For the dynode signals: they are ready to be connected to a lemo connector from the back bottom part of the calorimeter.
11. We may need adapters for the HV and “Booster” parts also. I will need to check this part.
12. Connect the PbWO4 “Booster supply” first. This is for the last three dynodes; they are all (crystals and lead-glass are separate) connected parallel for all crystal channels. The voltage values for each dynode will be provided separately.
13. Connect the HV power to one of the crystal channels (say, start with the first upper left, from the front).
14. Find the number of the anode channel from the PrimEx Tables, connect to that part of the “new adopter”. There is a need for good work to find out all HyCal related translation tables. They can be found either from the PrimEx website or Chao has them.
15. First, check if the channel is active (responding to the HV), look for signals from cosmic rays. Check both for anode and dynode signals (we may need the dynode signals also, it is not a big work to check them also). Make a comment in the journal.
16. At this initial stage, try to bring the LMS system up and working. It will (a) make the checking process faster for the rest of the channels; (b) we need to have the LMS fully functional for the experiments.
17. With the same procedure check all PbWO crystal channels, make comments in the journal.
18. At this point, we should be able to know: (a) what channels are fully operational (anode and dynode signals from cosmic rays); (b) is the signal from LMS there. …
19. To start repairing the “bad” signal channels and/or the LMS optical fibers we need an “expert” to be present to open the back and front parts of the HyCal calorimeter and start the repair work. The “expert” will work with the available personnel, training them in (a) finding the possible reasons; (b) possibly replace the PMT or the HV dividers; (c) fix the optical connections on the front part of the crystals; (d) …….
20. The same steps should be done for the lead-glass part after fixing the “booster” power supply module/box and/or possible electrical shortage in the dynode connections.