

PHOTOELECTRON PROCEDURES¹ AND DATA ACQUISITION

A. Heinrichs, Z. Papandreou and A. Semenov

WRITTEN: AUGUST 13, 2009 → VERSION 1

UPDATED: MAY 28, 2010 → VERSION 2 (MINOR UPDATES AND REORGANIZATION)

Overview

1. Confirm that the power is OFF on the LeCroy high voltage supply.
2. Open the 'coffin' and remove the centre-beam brace.
3. Insert a cardboard box with the fibres to be tested in the coffin, as well as a second empty cardboard box (two persons).
4. Replace the centre-beam brace beam.
5. Power ON the LeCroy unit and carryout measurements.
6. Power OFF, remove centre-beam brace and tested fibers, and repeat.

NOTE: All fibre handling is done while wearing cotton gloves, with the exception of the hand that is used to clean and/or grease the fibre's end.

Handling Instructions

1. Move the 4-m-long cardboard box containing the fibres tested at the attenuation length station and place inside the 'coffin' (two persons).
2. Lay a second, empty 4-m-long box next to the fibre box. (Move fibres from the first box to the test station trough and after testing place into the second box.)
3. Oriented facing the computer, Person 1 sits on the right of the signal cables and is responsible for the computer and inserting the fibre into PMT.
4. Person 2 sits on the left of the signal cables and is responsible for recording information in the logbook and placing the source on the trigger.
5. Person 1 chooses a fibre from the untested fibre box and holds it so that Person 2 can reach it. Then both place the fibre carefully in the testing trough.
6. Person 1 greases the polished end of the fibre with a small amount of optical grease, enough to just cover the tip.
7. Person 1 positions the fibre against the Hamamatsu PMT by threading the greased fibre through the Plexiglas guide's tapered hole and feeling for buckling and helical twisting of the fibre upon contacting the PMT's photocathode.
8. Person 1 holds the fibre down in this position and communicates to Person 2 to gently press the fibre down at a location near the trigger PMT

¹ This document has been created from the merging of FibrePhotoelectron-DAQ_v1.doc and FibreHandling-Npe_v1.doc

- with one hand, while with the other hand to place the collimator and source on top of the fibre (and trigger scintillator). The groove at the bottom of the collimator must mate to the fibre so as to prevent the fibre from being tugged out of the PMT. The fibre is kept as straight as possible while in the testing trough.
9. Upon a signal from Person 1, Person 2 places the source on the fibre. Person 1 then checks again to make sure that the fibre is still in contact with the PMT.
 10. Rotate the collimator slightly to see if the fibre moves in sync with it, in order to test if the source was placed on correctly. Avoid affecting the fibre's contact to the PMT.
 11. Upon signal from Person 2 that the source has been correctly laid, Person 1 lets go of the fibre and both lids of the coffin are closed and the test commences. Weights are placed on the coffin lid to ensure good optical sealing.
 12. Monitor the data using an online PAW script, which indicates graphically the acceptable data limits.
 13. If the test was successful, Person 2 removes the source while Person 1 pulls the fibre off the PMT and out the Plexiglas guide and wipes off the optical grease using a Kim wipe.
 14. Similarly, if the test was unsuccessful, Person 2 removes the source and the fibre is wiped, re-greased, re-inserted. Retesting is done until data fall within the acceptable limits or up to a maximum of three times before abandoning further testing for this fibre.
 15. After the successful test of a fibre (see below), remove the fibre from the trough and carefully move it to the 'tested fibres' box (two persons).
 16. Once all fibres are tested, remove the 'tested fibres' box from the coffin, label it and transfer it to shelf.
 17. Record run numbers and relevant information in the dedicated logbook.
 18. Enter a 'shift summary' into the Elog at the end of each shift.
 19. Disassemble the setup every week: thoroughly clean the tapered hole of the Plexiglas rod and PMT window.

Apparatus Signal Cables/ High Voltage Power Supply Channels}

1. NEVER step on a signal cable.
2. Connect the signal cable labeled 'Calibrated PMT' on the coffin to the top red delay line labeled 'in'.
3. Connect the signal cable labeled 'Photodiode' on the coffin (this is for the trigger counter and not a photodiode) to the splitter panel labelled '10'.
4. Set the Calibrated PMT to 2200V on the LeCroy HV supply (Channel 3).
5. Set the trigger counter ('photodiode' label) to 1700V on the LeCroy HV supply (Channel 2).
6. Check the LeCroy high voltage power system for the correct voltage by holding down the 'Channel' button and pressing the up or down arrow.

7. If Channel 2 and/or Channel 3 are not at the correct voltage, change the voltage by holding down the 'Voltage' button and depressing the up or down arrow.
8. Pressing the 'On' button on the mid left of the LeCroy HV crate turns on the voltage. Pressing the 'Off' button immediately beside the 'On' button turns off the voltage.

ATTENTION: The HV must be OFF if the coffin is open and/or the room lights are on.

The Data Acquisition System

Computer name: sklavos
User: midas
Password: *****

1. Turn on the central white switch on the black Kinetic Systems Model 1502 CAMAC Crate located second from the bottom.
2. Turn on the small black switch on the top brown right faceplate labeled "bin".
3. In the first workspace, open two terminals and in both change to the directory */localhome/midas/test.oldcode*
4. In one of the terminals, type *dio ./fal* and always choose option '4'.
5. In the other terminal, type *odb* and again choose option '4'.
6. After confirming that the fibre is correctly positioned close the coffin lids and turn the room lights off.
7. Person 2 turns ON the High Voltage.
8. To be ready to run a test, type 'start' in the odb terminal. Enter the following information at the prompt:
 - a. Comment: Sr90 at 205cm; trig at 1700V/40mV/100ns; R329-02 at 2200V; fiber [fibre code]
 - b. Run number: [run number]
 - c. Are the above parameters correct? ([y]/n/q): [enter]
 - d. Starting run # [run number]
9. Person 2 enters in the logbook the end time, test verdict, and diameter of the last tested fibre and then the fibre count, fibre code, run number, and start time of the current test.
10. After the data event count has met or exceeded 100000 events, Person 1 types 'stop' in the odb terminal. Then in the other terminal, '[shift] !' is pressed and 'reset' is typed. The letters will not appear as this is being typed.
11. While waiting for the terminal to reset, turn off the High Voltage.

Data Evaluation Script

1. After the terminal has been reset, type `./ana [run number]` and choose option '4'.
2. Move over to the other workspace on the computer and view the raw data by typing `exe phetest [run number]`.
3. The peak on the distribution must be over (to the right of) bin 50 or the red line. If the mean is between the red and the green line, REPOSITION the fibre correctly and run the test again on the next run number but with same name and count number all documented in the logbook. If the peak of the distribution is past the green line, the test was successful.
4. If after three attempts at testing the fibre the above criteria are not met, mark the fibre as failed.
5. If the test was successful, then Person 2 checks again for the High Voltage to be OFF and signals for the coffin to be open. Person 2 then removes the source to be placed on the floor of the coffin while Person 1 pulls out the fibre and wipes off optical grease with the Kim Wipe, which is available.

Fibre Diameter Measurement

At any time measure the diameter of 30 fibres from each shipment using a micrometer caliper, at three positions along the fibre: 50, 200 and 350 cm. Use the micrometer sideways with the fibre oriented as to face the same direction of that of dial and take multiple readings recording the average.