

Proposed radiation measurement in the wideband neutral dump area.

David Underwood
Argonne National Lab.
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We propose to do radiation exposure of small electromagnetic lead_scintillator stacks on the face of the neutral dump of the wide-band photon beam.

There are several objectives at this point:

- 1) We believe that there is a shielding effect of low z materials near the lead in an EM calorimeter. This is important for both radiation damage and compensation in calorimeters. We have only been able to get a crude indication of this so far but the dye film technique should permit a better measurement.
- 2) The original intent was to use the MP or Wideband neutral dumps as facilities for damaging a calorimeter stack in a realistic way. The light output and resolution of the stack would be measured in an electron test beam before and after the exposure. There may still be some interest from the CDF and SDC groups who are doing such measurements in test beams. One intent was to avoid disassembling the stack. This is compromised by the observed induced activity of the lead.
- 3) We want to check that our calculations of flux vs dosage are realistic. This is important for designing calorimeters for high radiation environments.
- 4) We want to refine the dose measurements done inside the stack to see what the actual dose on the scintillator is. This is done with thin radiochromic dye films.
- 5) We want to find what radioactive isotopes are produced by the exposure of the lead to neutrons. This is important for access to SSC calorimeters.

PERSONNEL

So far this has been done by D. Underwood with help from Argonne National Laboratory Technicians. The help of Fermilab's Radiation Safety team and Fermilab beam physicists will be required. It would be of use to SDC people in other test beams.

IMPACT ON FERMILAB

- 1) We would want access to remove or swap stacks roughly once per 1 or 2 weeks at the convenience of the experiment running in the beamline. This might be done 3 or 4 times altogether. With MP running parasitically for 30 GeV electron tests the only option for 1991 running is PB.
- 2) We need help from Fermilab radiation safety in installing the stack, checking the operation of the neutral dump with the stack in place, measuring the activity of the stack as a function of time after removal, and monitoring while disassembling stacks if necessary.
- 3) In order to measure activation gamma spectra, either Fermilab facilities and people would be required or special shipping to Argonne. This would only be done once if at all.

SIZE OF STACKS AND SUPPORTS

Stacks will be 10 cm by 10 cm by less than 10 cm deep. It is probably not realistic to make them any bigger. The spot size of the neutral beam is roughly 10 cm. The depth

available is typically 1 foot and the stack must move in and out quickly and easily. The radiation levels from the neutral dump might be compromised by deeper stacks.

A stack support will be required for these tests and will need to be design especially for the area assigned.