Minutes of July 15, 2002 meeting on Layer 0 Grounding

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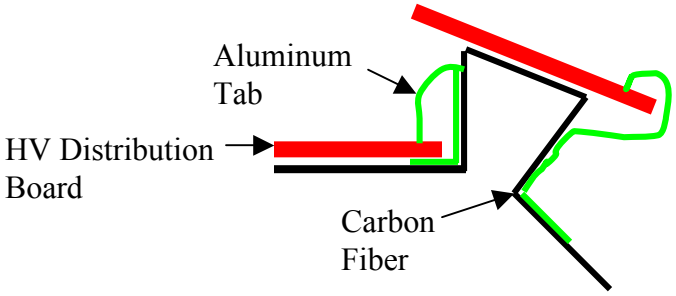
We discussed the grounding of the carbon fiber for the layers 0 and 1 detector.

We will imbed approximately 12 micron thick Al foil in the carbon fiber. The coverage of the carbon fiber will be between 10 and 20%. The foil will be placed as strips along the vertical sides of the crenellated structure and extending out into the flat area to achieve the desired coverage. The connection to the HV distribution board will be with a tab from the top edge of the foil. The HV will be insulated by a Kapton layer. The foil will be on either side of each channel; one side will feed the upper board, the other will feed the lower board. See the figure below (Sensors and Kapton insulation not shown). Connections will be made on the side opposite the HV connections. UW will make a sample for testing at Fermilab. This tab may need to be stronger than aluminum foil in order to survive the analog cable installation and other assembly work. This connection is not yet understood so it needs some design effort.



The pyrolytic graphite will be connected directly to the HV side of the sensor by conduction epoxy so no special work is needed for grounding. Layer 0 may have carbon fiber attached in a similar fashion so it is also OK.

The Z=0 connection between the north and south half should be electrically insulating with low capacitance. (less than 1 nF). This is not thought to be a problem. The goal is to have a 10 ohm impedance at 10 MHz.

The overall grounding of the carbon fiber will be done through the end bulkheads. At least the outer one will be made out of a conductor (Aluminum?). In addition, the inner hexagonal tube will have a spiral of Al foil so that it can be readily attached to an external ground. Tests will be done at Fermilab to see if this spiral wrap is necessary. The idea is to ground all the carbon fiber by attaching an external ground to the end bulkhead – possibly provided by the junction card support structure. The bulkhead design is not yet complete so good communication will be needed to make sure that the final design is both mechanically and electrically acceptable.