Chat with Jim Zagel on IPM work

January 21, 2015

MI and RR IPM work continues. They did a lot during the recent shutdown. Then repaired all the channels on MI IPM104, but when they put it back together, a couple of the channels failed due to cable problems. Galloway is fixing that now.

# Long term improvements

To see one booster batch, a very fast HV switch is required. Zagel has asked for support from the RF Department to build a tube-based switch that can turn on and off the control grid on the MCP. They are not “motivated” yet to make this happen. Zagel hopes that will happen soon.

Troy Petersen is working on a FPGA circuit to control the control grid as the beam puts signal on the MCP. The problem is that in order to get clean signal, the gain has to be “high enough.” But the impedance of the readout circuit is a bit too high, so change does not bleed off the MCP channels very fast—if you try to get 8K turns, the last chunk (half?) are saturated and there is not signal. They are experimenting with a system (Petersen’s FPGA) that will pulse the HV so that it will get N turns of data followed by M turns with the control grid off (and the charge can bleed off). Zagel’s first guess for N and M are numbers like 700 and 200. But there is probably an optimum for these numbers, which Petersen will find (1000 and 300? 4000 and 1000? Who knows?). To complete this requires (a) that Petersen returns from Accelerator School (1.5 weeks) and (b) special resistors, ordered in November, arrive (any day now).

It is also possible to reduce the impedance of the readout circuit, but Fellenz (the likely guy to do this) does not have the time to figure this out. He tried adding a parallel resistor, but that did not work—it caused an unexpected low-frequency oscillation. It is tricky because the circuit is a “Pi Network” (<http://en.wikipedia.org/wiki/Antenna_tuner#Pi_network>) that needs special consideration and tuning.