Hex Cell Study

12/13/2011 – 1/03/2012

On December 13, 2011, copper plates separated with a hex cell spacer were connected to a 10000 picofarad capacitor signal readout. Signal readout channel four was connected to UA Test Bench while channels one through three were terminated with 50 ohm resistors. High voltage was connected and set to 1.8 kilovolts. A plastic enclosure was placed over the plates to create a semi-isolated state. At 15:35 UA Test Bench was started and set to run for 10000 triggers.

External humidity data was collected from atmo.arizona.edu and from that data hourly averages were made. The internal temperature was recorded using temperature sensors located in the room and from that data hourly averages were made. These were graphed alongside hourly spike and noise rates.

The room temperature sensor stopped recording for approximately 29 hours, from December 19 at 08:00 to December 20 at 13:00.

Weather conditions for the run varied significantly. At the start of the experiment, it was raining and had been for approximately a day. On December 15, it was very foggy and it rained again from the evening of December 18 to the morning of December 19. These days were marked by having very high external humidity averages.

On January 3, 2012, after approximately 498 hours of continuous running, UA Test Bench was stopped. A total of 7000 triggers had been recorded, 6930 of which, or 99% of the total, were classified as spikes.

A strong correlation can be seen in the data between the external humidity and the spike rate. The peaks and valleys of the spike rate follow the path of the humidity very closely during the rainy first half of the run. During the second half of the run, the external humidity dropped to average in the low twentieth percentile. At this point, the spike rate dropped and remained below ten spikes per hour, no longer obviously following the humidity trend as closely.