Sealed Cryostat Study

1/12/2012 – 1/23/2012 and 1/30/2012 – current

On January 12, 2012, the large HEC was closed within the cryostat and connected to all four signal readout channels. The high voltage was connected and set to 1.8 kilovolts. UA Test Bench was started and set to record 10000 triggers at 14:40; the temperature within the cryostat was set to record in conjunction. This run was to create a baseline for the number of spikes seen in a closed environment.

On January 17, the vacuum was turned on at approximately 08:00. UA Test Bench was paused after 70 triggers because the power supply voltage began to trip. We attempted to reset the high voltage four times before we decided to allow the vacuum to run for an undetermined amount of time before continuing. The high voltage was reset at 09:20 and the turbo pump was turned on at 09:30. The high voltage tripped twice more before holding at 1.8 kilovolts at 09:55. UA Test Bench was restarted and the cryostat pressure was approximately 7x10-3 torr. At 09:59, the threshold trigger was dropped and UA Test Bench was restarted. We observed the spike rate drop significantly in response to the vacuum.

On January 18, a heater within the cryostat was turned on at 09:15. The heater was allowed to run at 20% power until 10:35, when it was raised to 25%. It continued running until January 20 at 15:15, when it was turned off completely. UA Test Bench continued to run until January 23, at which point the cooldown was started. With the addition of the heater, we saw the spike rate drop to nearly zero.

We observed the argon gas breakdown while the electrodes were at high voltage. As a result, data could not be taken during the filling process. On January 30, the cryostat was completely full of liquid argon and data taking was set to resume. We were unable to set the high voltage to 1.8 kilovolts without the power supply tripping. A possible reason being, the presence of argon gas bubbles trapped within the hex cell spacers. Instead, the high voltage was set to 1.55 kilovolts. UA Test Bench was started at 10:30. This run is ongoing and will last approximately 120 hours. At the present time (48 hours) there have been 28 recorded triggers, 5 of which have been spikes.