HV test 12/20 writeup (from logbook) D. Shuman

This is a short write-up of my notes in the logbook on performing High voltage testing of the various mesh planes experiment at reduced Xe pressure during the Xe reclamation process.

Starting pressure = 213 psig, temperature = 23.2C on side thermocouple; 24.5C on top thermocouple.
Onset of breakdown was noted by watching the oscilloscope trace of the single PMT
It would clearly "go wild" when a discharge, usually audible, occurred. It would settle back into a quiet pattern punctuated by occasional short bursts typical of EL production, when EL voltage was above some several kV (EL onset voltage not noted here). The trace was quiet with minimal EL voltage
Sometimes intermittent single sparks would happen, then quiet down, voltage was then increased until a continuous discharge occurred, then quickly turned off.
Other times a buzzing sound, indicating a continuous breakdown typified the onset of breakdown

	MESH Plane Voltages				Breakdown onset Notes
Press.	Drift Start	Drift end/ EL start	EL end	PMT	notes
(psig)	(kV)	(kV)	(kV)	(kV)	
213	-12.5	0	0	-1	"buzzing sound

at this point I vented some gas into the reclamation cyl. until gauge P3 read 184 psi
Therefore we obviously did not fill the reclamation cylinder with Xe during initial fill

184	-14.6	0	0	-1	"buzz"
184	0	5	12	-1	"buzz", no single sparks
184	0	9.999	16	-1	some singles, then buzz
184	0	0	7-7+	-1	single, then buzz

Vent more gas till P3=150 psig, no source (Na)

150	12	1	0	-1	single, occasional
150	14.8	1	0	-1	occasional buzz, mostly quiet (PS topped out)
150	9	0	5.5	-1	intermittent, not very audible
150	9	5	10.5	-1	"
150	9	9.999	15	-1	intermittent, very audible
150	9	8	13.6	-1	mix of aud./nonaudible intermittent "buzz bursts"

I suspected that the audible sparking was to the chamber wall and the "almost inaudible" was across the EL gap. I started using a large screwdriver against my ear (stethoscope), against the vessel to listen for EL gap sparking, which was becoming less audible at lower pressures and voltages

I fully opened the valves to C1 reclamation cyl., and pressure based out at 138 psi (using the electronic gauge here, reading 2.778V). I then chilled C1 with 2 flasks LN2
I then vented more gas into C1 to otain 100 psi (2.0V on e-gauge) temps= 21.9C/22.9C

100	11.5	0	0	-1	audible buzz, stopped after 1/2 sec.
100	12.5	0	0	-1	audible, intermittent
100	9	0	4.5-4.7	-1	inaudible (audible only faintly with "stethoscope")
100	9	5	9.5-9.7	-1	inaudible
100	9	10	12.5	-1	audible
100	9	6	10	-1	inaudible

100	9	7	12	-1	audible

vent more gas to 60 psig

60	10	NR	NR	NR	audible, buzz stopper after 1/2 sec.
60	11	nr	nr	nr	audible, less so than before, intermittent
60	9	0	4	nr	
60	9	4	8.5	nr	at this point some sustained sparking ~1 min. est.

occurred and I reduced EL end voltage to stop discharge. Immediatelyafterward
and I could not sustain more than +/- 1kV EL differential voltage without seeing significant random,spiky noise on the oscilloscope trace (1 PMT). This remained the case for ~10 min. but went away after leaving zero differential voltage on EL fopr some indterminate time. Then, I retested:

60	9	4	9	nr	current limiter (on EL end) (0.1V, reading 0/10) tripping, no unusual scope noise this time
60	9	4	9	nr	"

I then set current limiter to 0/20 (0.2V)

60	9	6	8		current limiter tripping at 0.2V, no unusual scope noise

Test concluded, it appears some nonvisible (to PMT) corona was now occurring (to ground?) on EL end
Note: upon reducing voltages to zero, I note that EL end voltage panel meter does return to zero until the EL start voltage is reduced to zero.
I then opened V14, V18 all the way and the pressure e-gauge based out at -0.257V
I closed V14 and opened V16 whereupon the e-gauge read -0.263V and convectron read 1.56 torr
I then turned on the BP; after a few minutes (1-2min) I note ressure is not going down but rising to 1.8 torr and a whining sound and burnt smell develop. I then shutdown the BP closed V16, V13, and V18
(lab notebook says "We" here where I say "I" , but I do not remember anyone
other than myself present. -D. Shuman