

Recent Dark Current Results

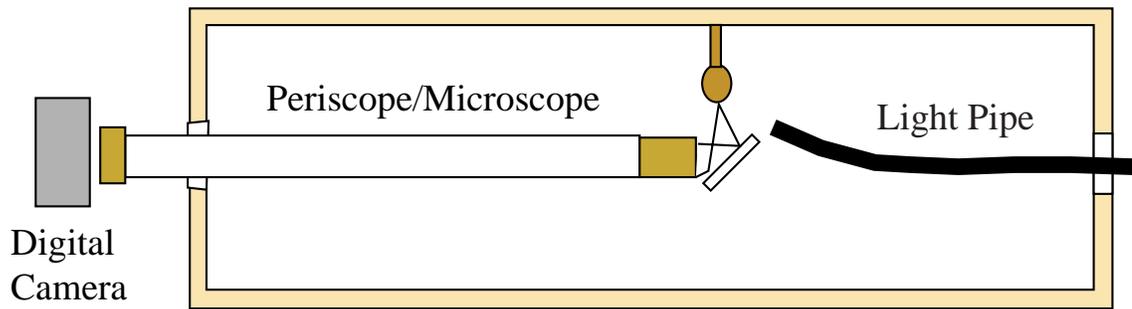
J. Norem

Collaboration Meeting, Long Island, NY
5 / 8 / 02

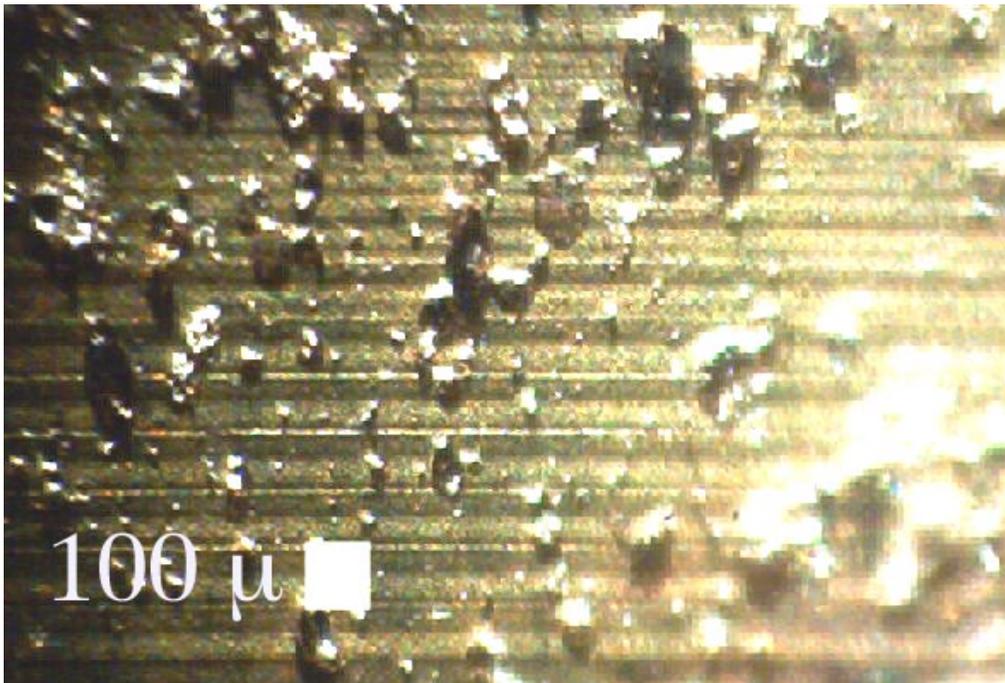


Open Cell Cavity

- A periscope/microscope has been built which can look at the irises of the open cell cavity.

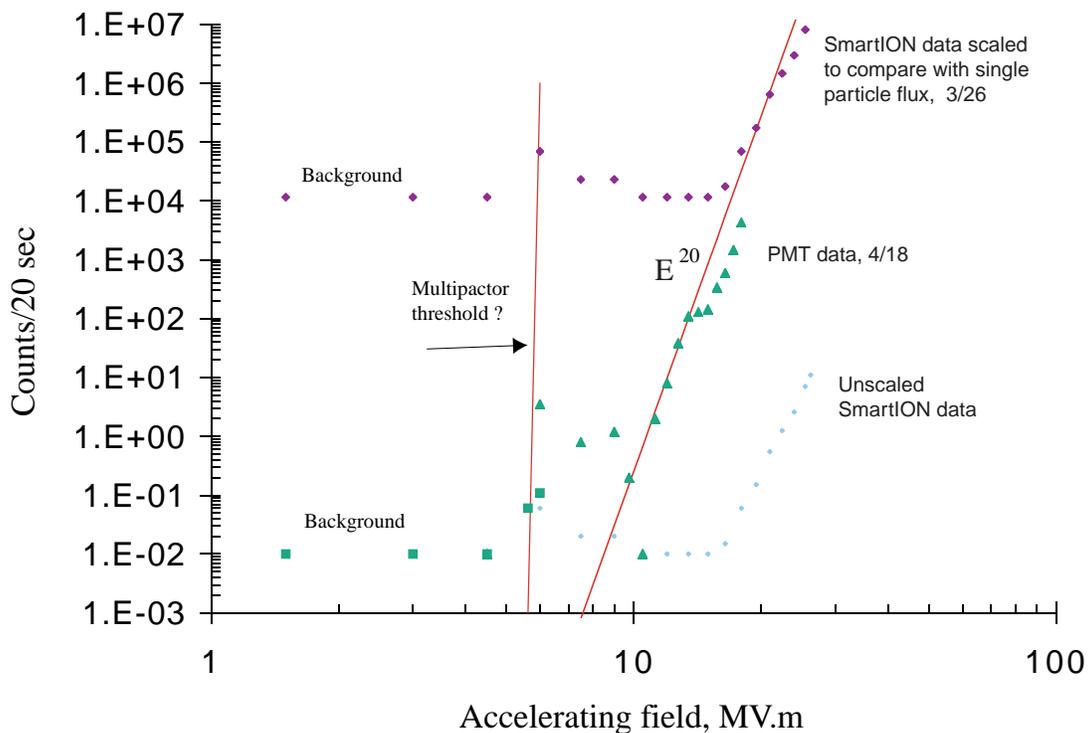


- We see some of the same deposition of liquid Cu drops on the irises. We also see evidence of lathe marks. This work is continuing.

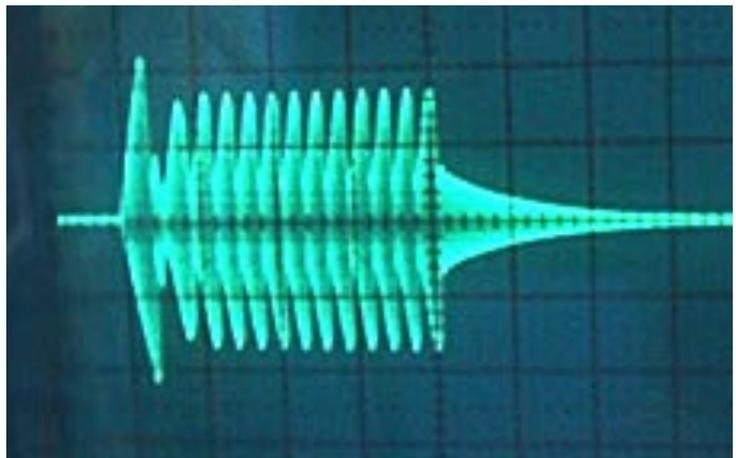


LBL Cavity

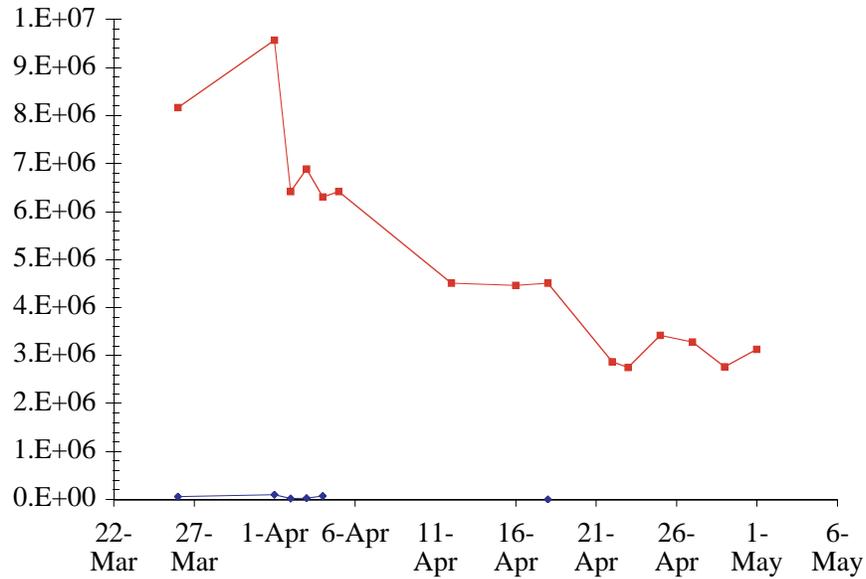
- We can combine the results from the PMT counter and the SmartION radiation monitor to see a consistent (but not final) picture of the dark currents in the cavity.
- Recent data shows two effects:
 - Field emission - similar to that in the open cell cavity
 - Multipacting electrons - undocumented phenomena!



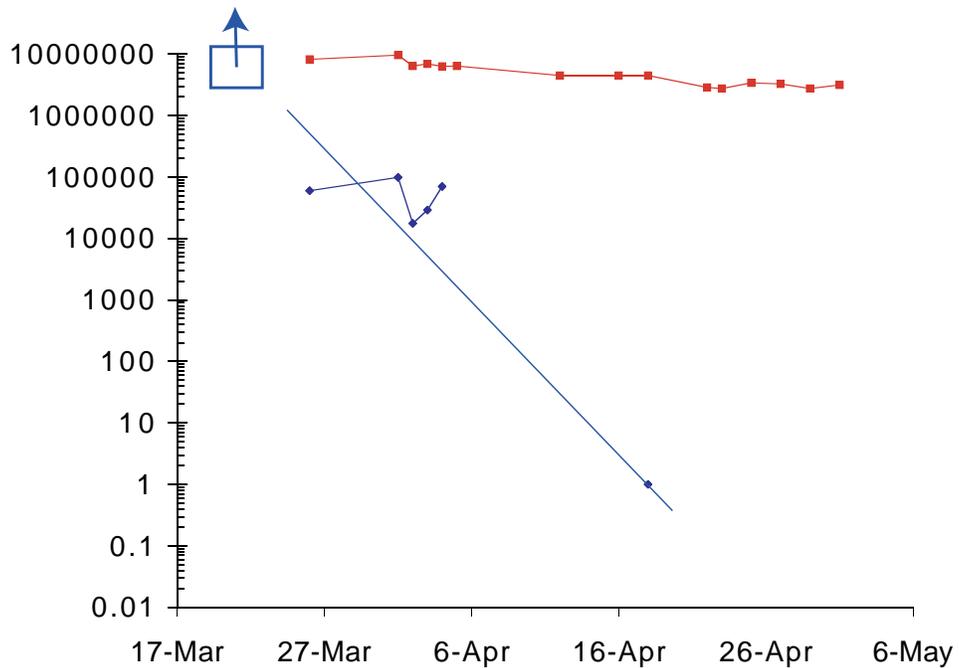
- Multipactoring
 - Threshold = 4 V
 - = 6 MV/m



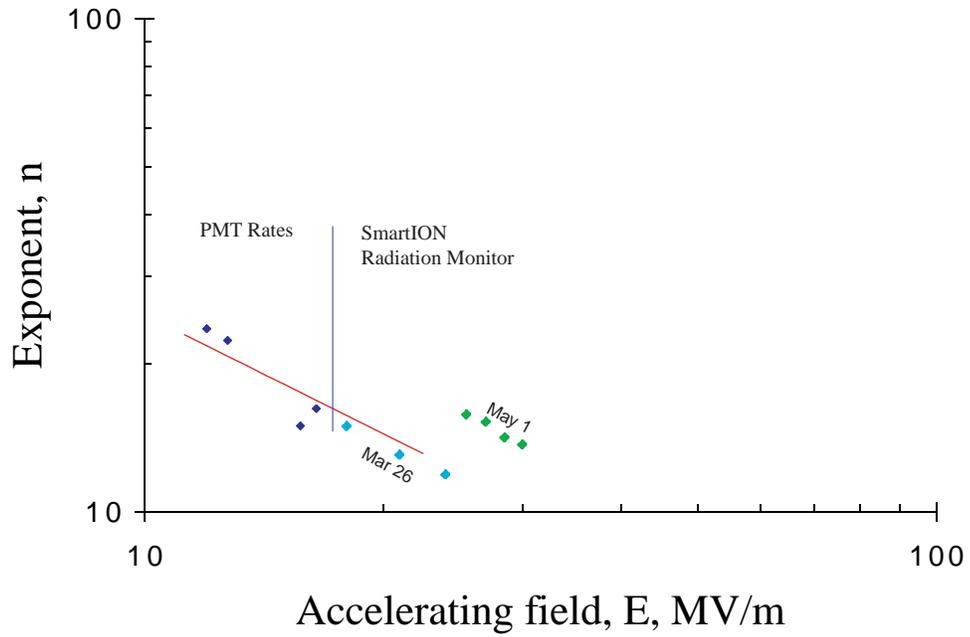
- The conditioning process is improving the dark currents in the cavity, for example at 25.5 MV/m . .



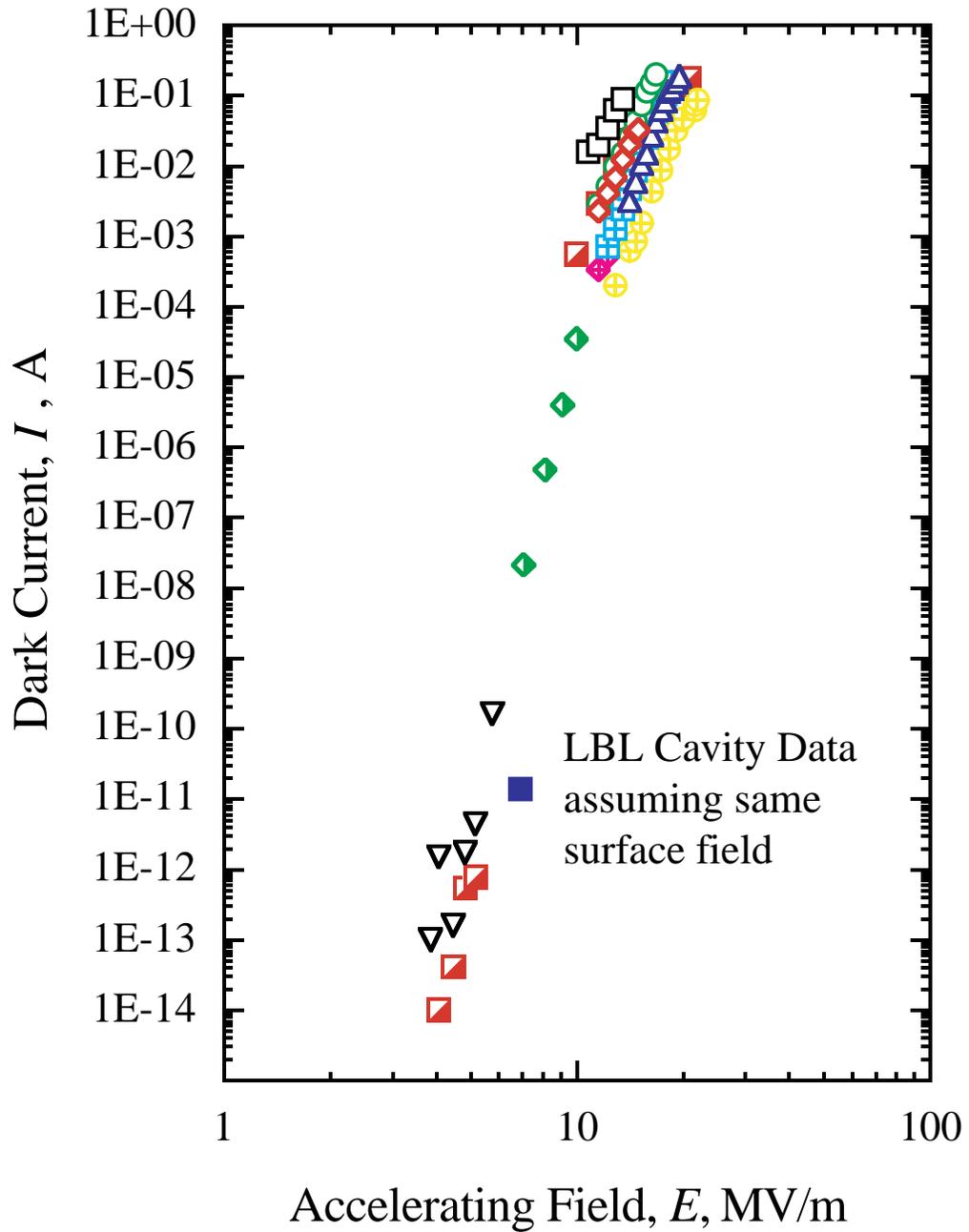
- . . but the Multipactor current seems to be dropping much faster.



- The value of the exponent n seems to be saying that we are not very close to breakdown or any ultimate limits.



- The dark currents in the cavity are roughly comparable to those in the open cell cavity, for comparable surface field,



Summary

- Although cavities have been constructed and conditioned all over the world for the last 50 years, we continue to find and document what seem to be new phenomena.
- The idea of electrostatic stress causing breakdown seems to be new.
- We see Fowler Nordheim field emission which decreases slowly with continued conditioning.
- The currents which seemed to cause multipactoring in the early operation of the cavity seem to be rapidly decreasing with time at low field.
- There seems to be a high field multipactoring phenomenon which seems constant with time.
- The dark current rates from the LBL cavity are roughly consistent with those of the open cell cavity for comparable surface fields.