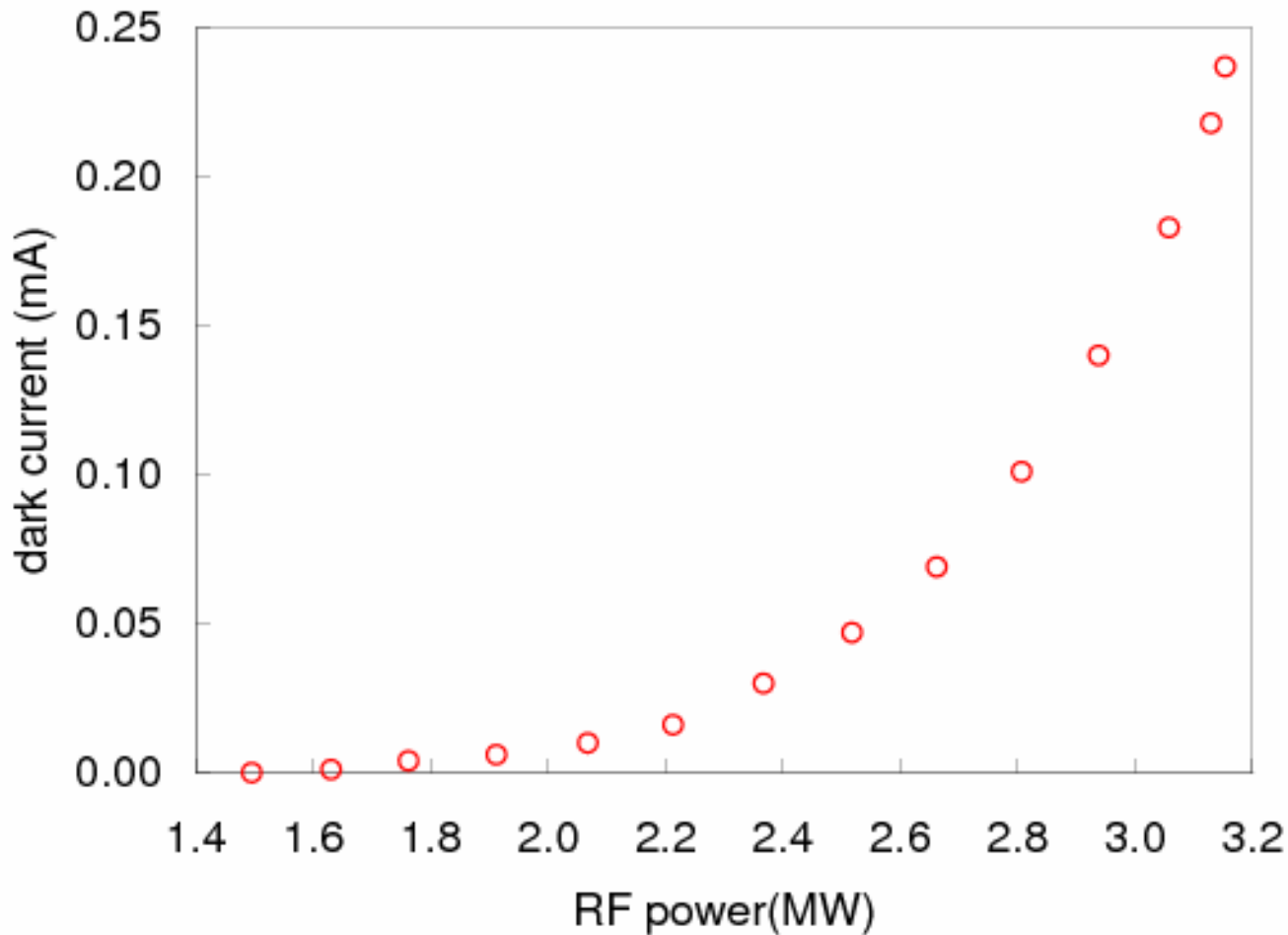


1. Dark Current Study
2. Damage of Cathode #78.1

Jang-Hui Han

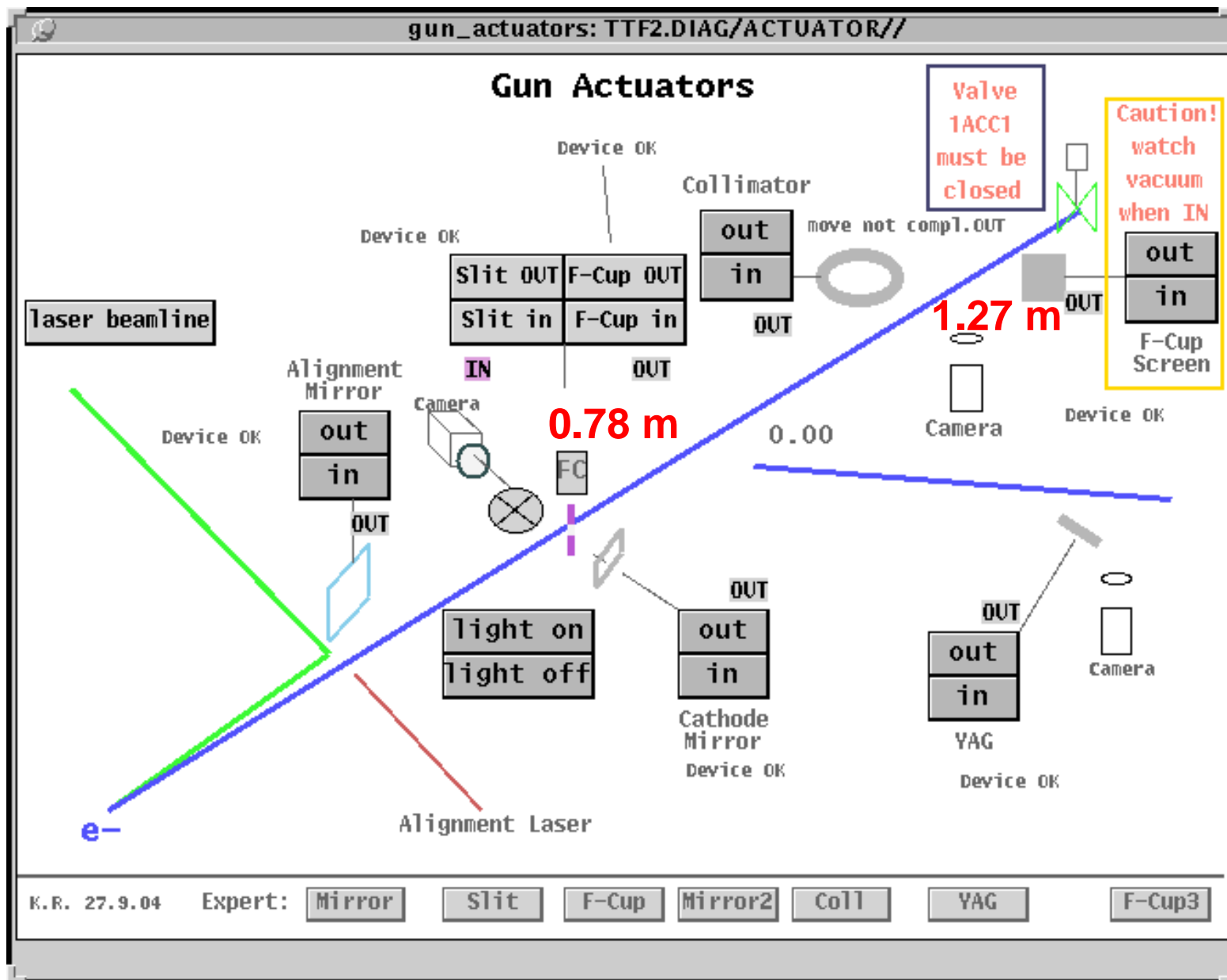
26 September 2006

- Dark current generated at the gun has a similar beam dynamics as the electron beams.
- Collimators at the dog-leg cannot eliminate the dark current effectively.
- Possibly, the dark current is lost at the undulator.

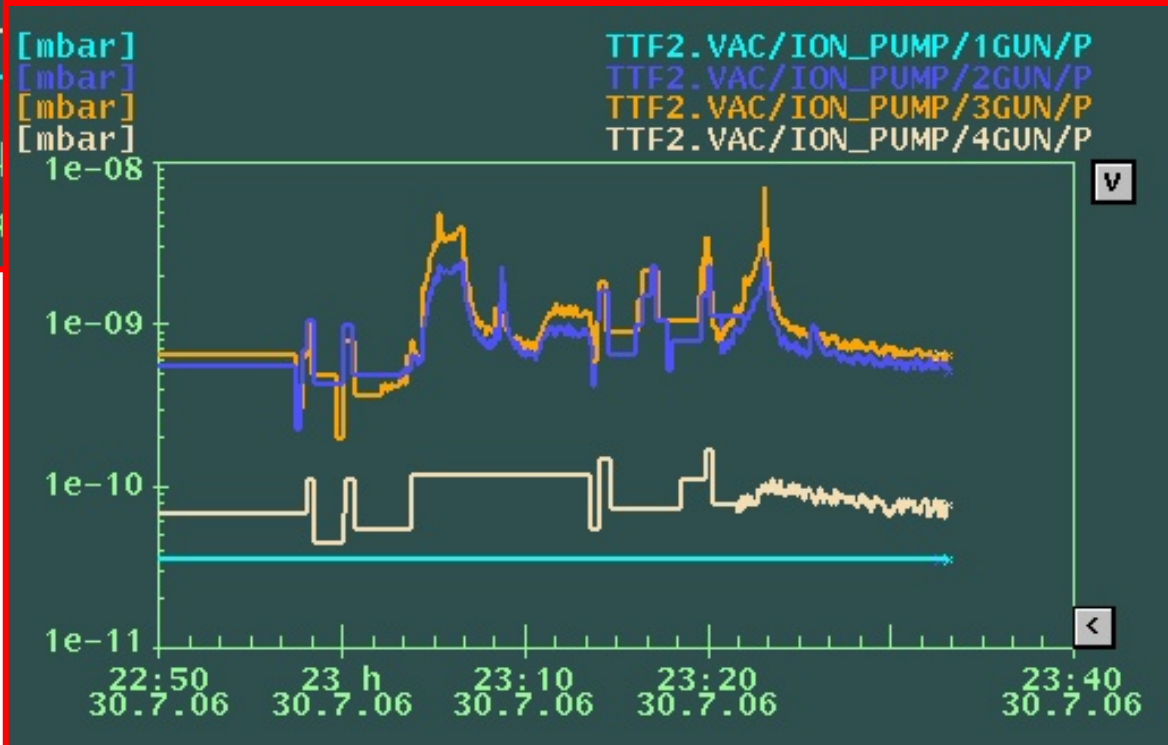
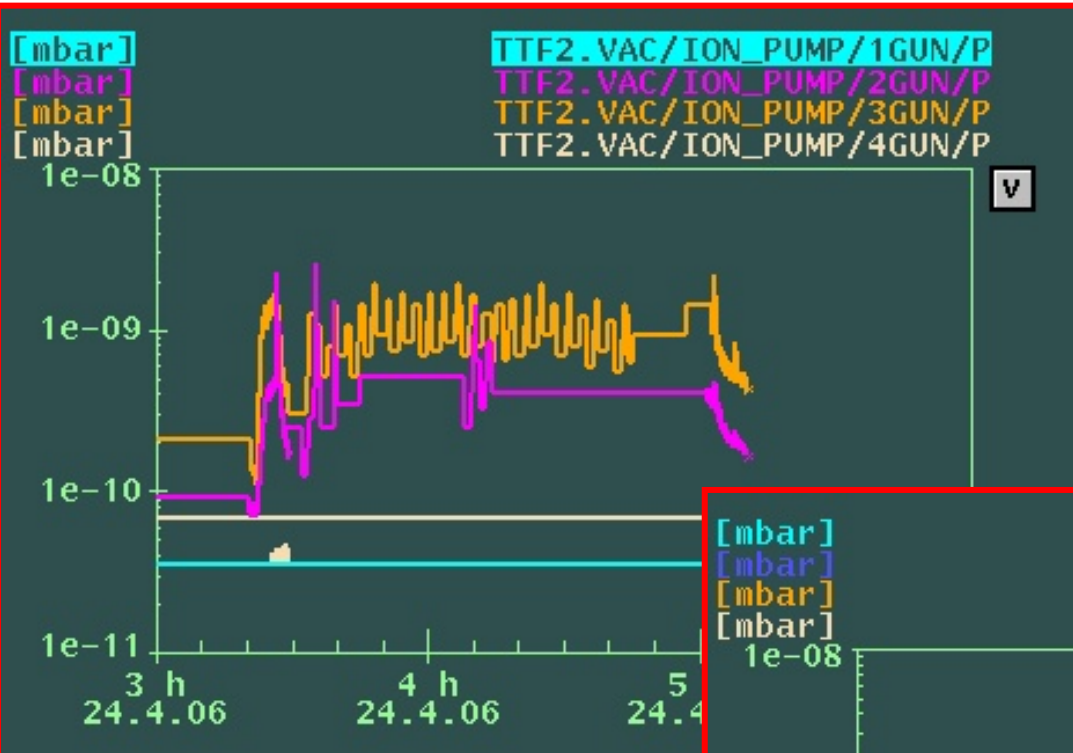


24 April 2006
at 2GUN

Measurement Points

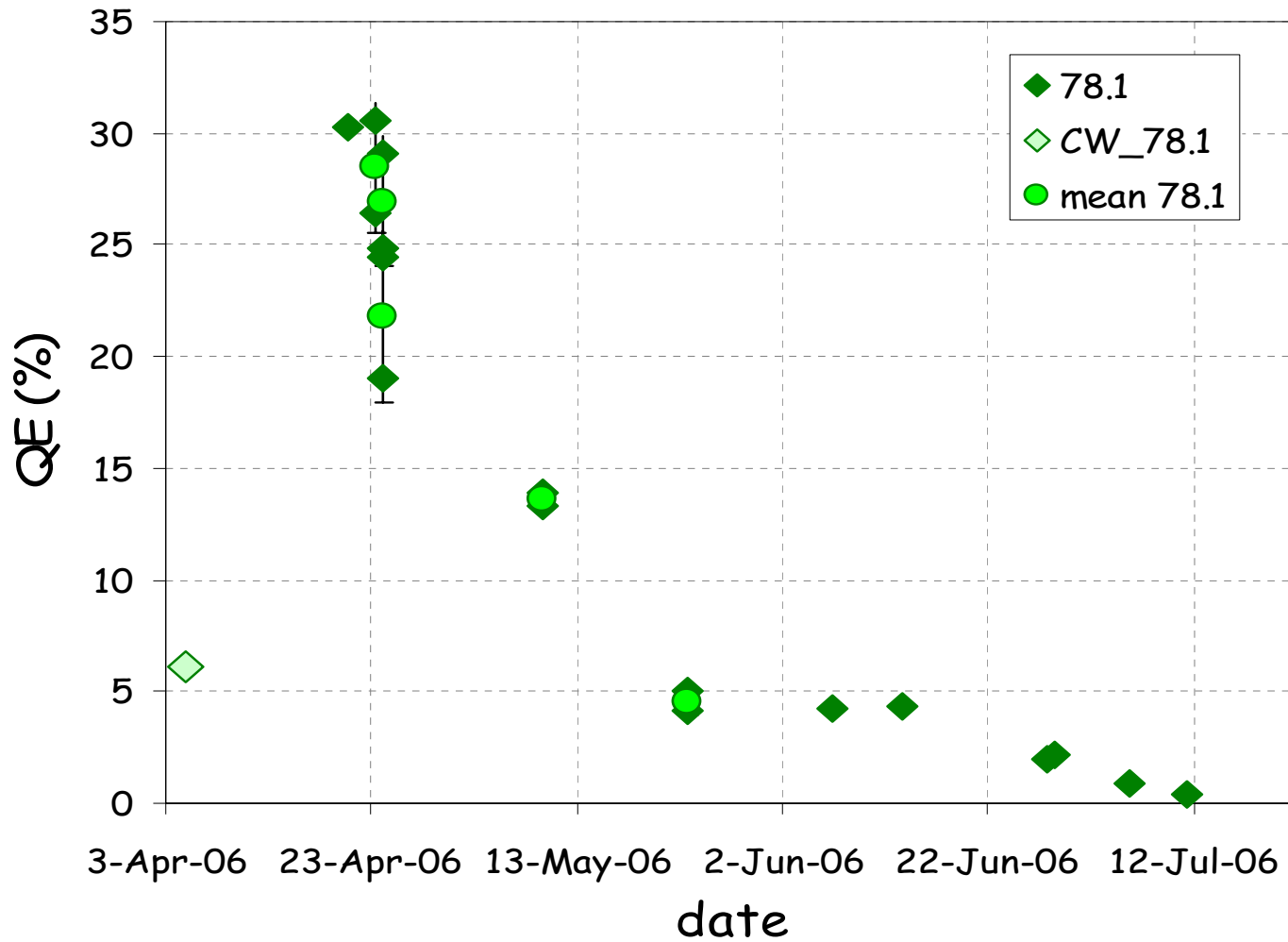


Pressure Increase

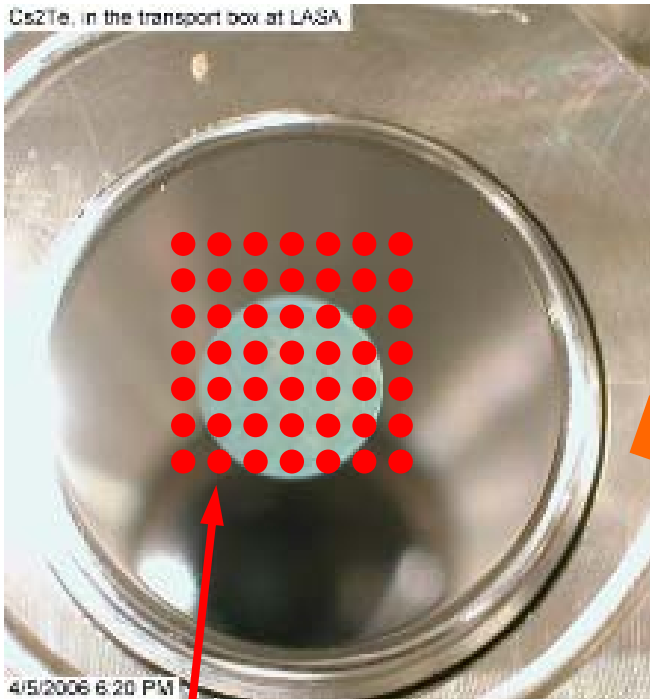


Main solenoid current scan not possible

QE of Cathode #78.1

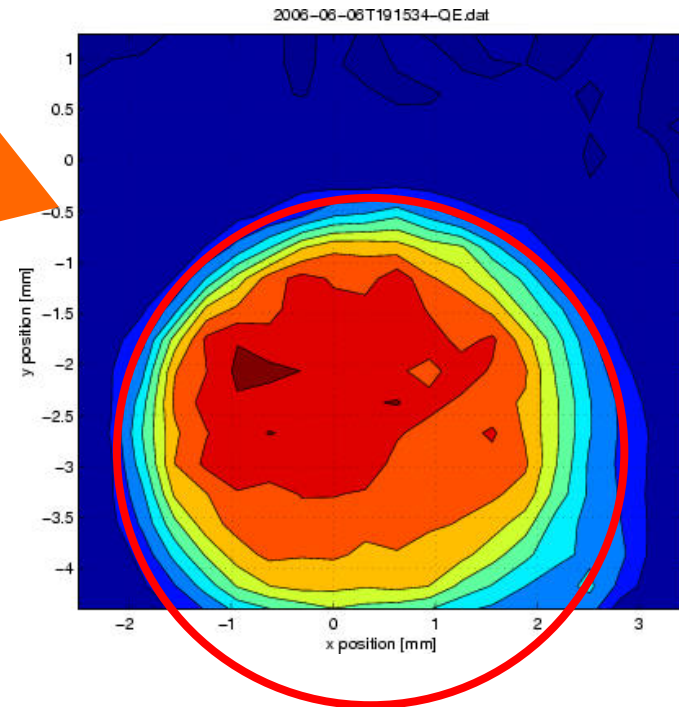


Abrupt decrease down to < 0.5%



Scan over the cathode surface
Measure bunch charge with the first ICT
(Program written by S. Schreiber)

$\phi \sim 0.2$ mm
step size 0.3 mm



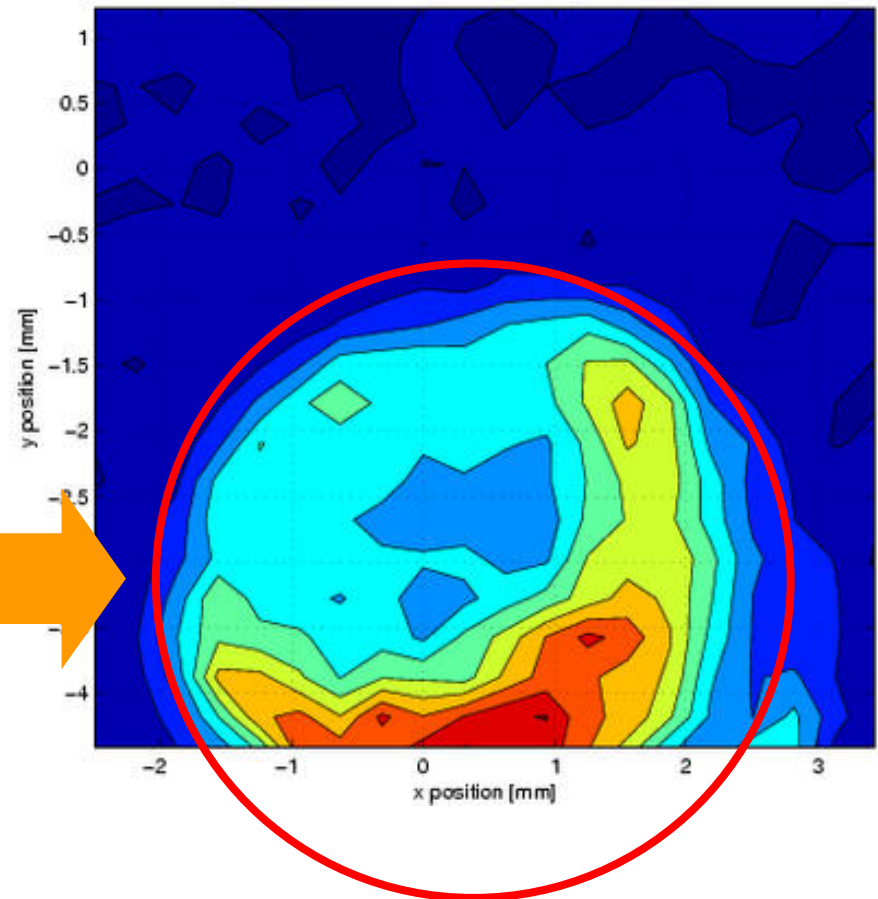
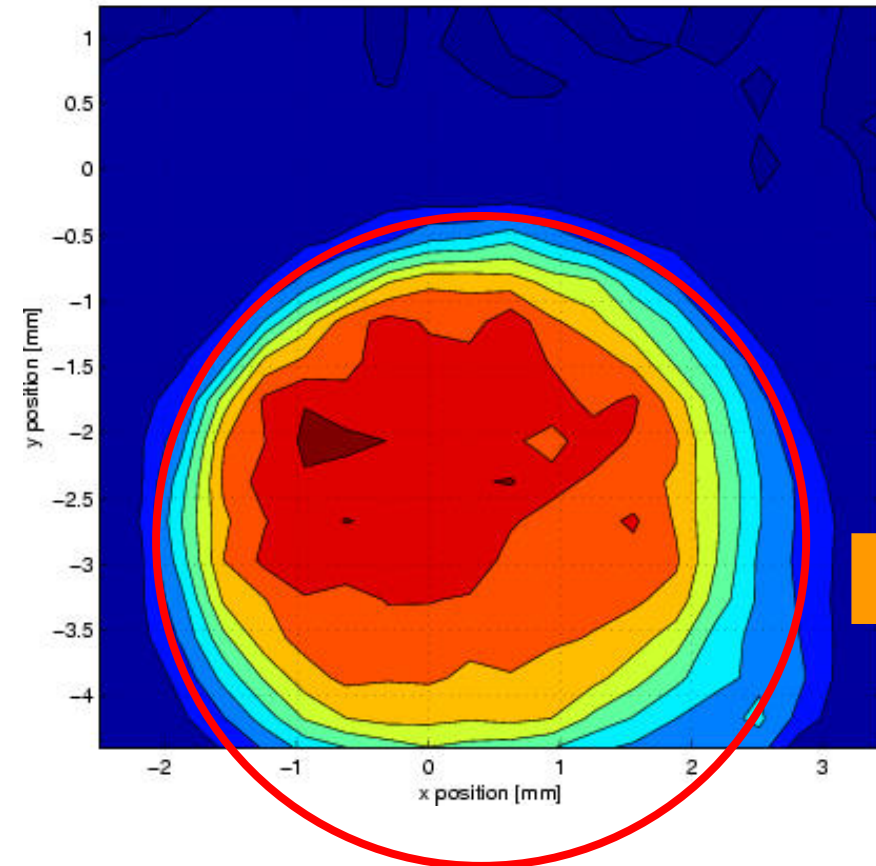
Cathode #78.1 (relative QE)

when fresh (6 June 2006)

when damaged (11 July 2006)

2006-06-06T191534-QE.dat

2006-07-11T081028-QE.dat



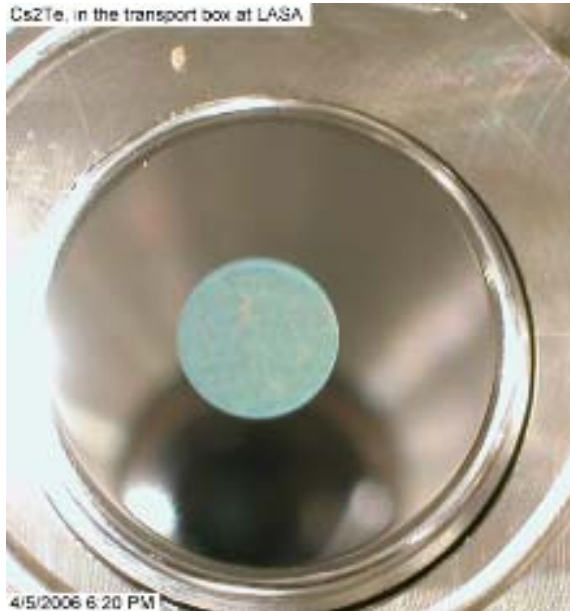


Photo taken at LASA
after the preparation
(5 April 2006)

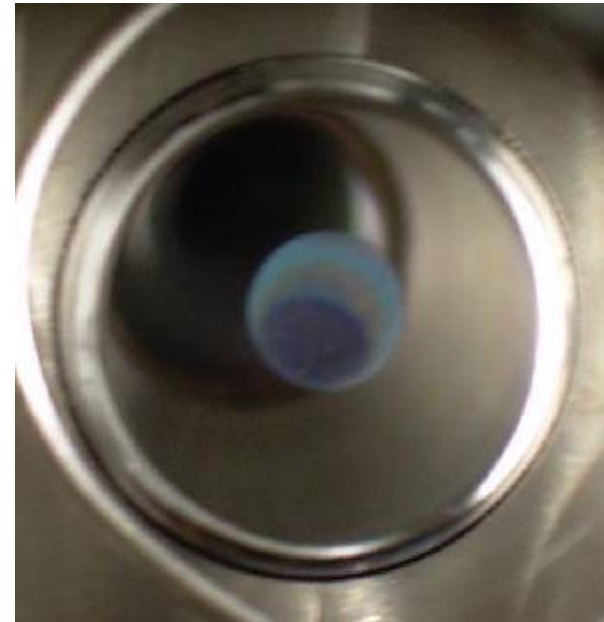


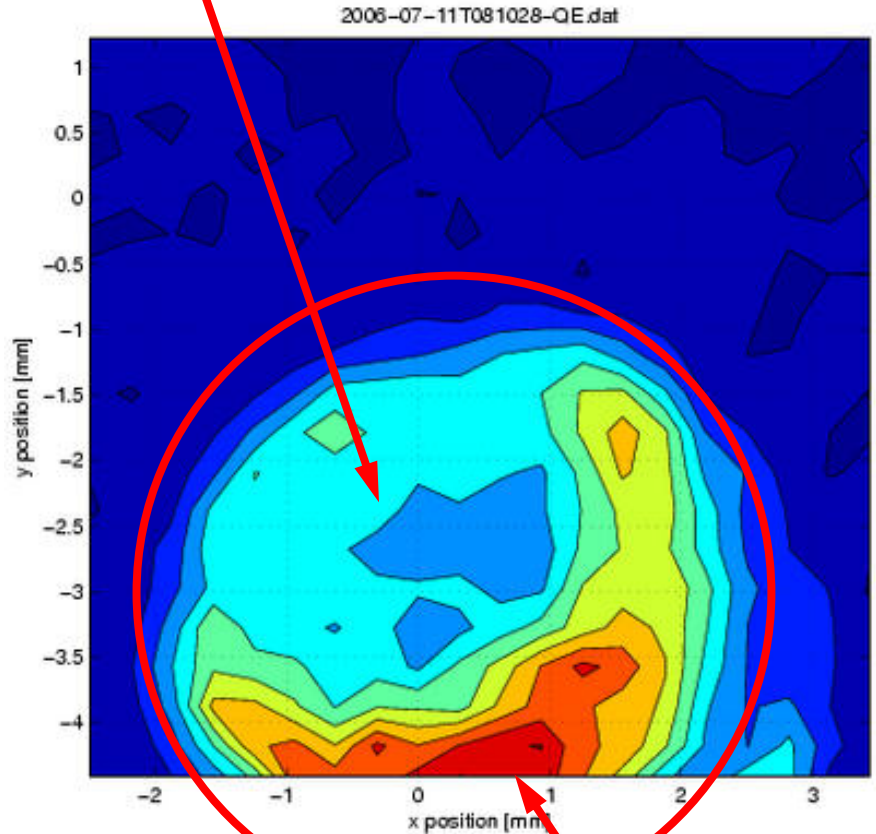
Photo taken at DESY
(7 August 2006)
Not used since 11 July

burned region



fresh region

low QE



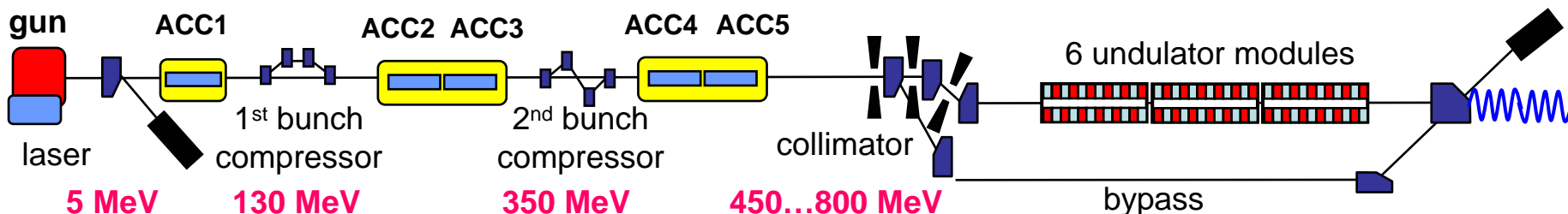
high QE

Low energy dark current from the gun might not make such damage

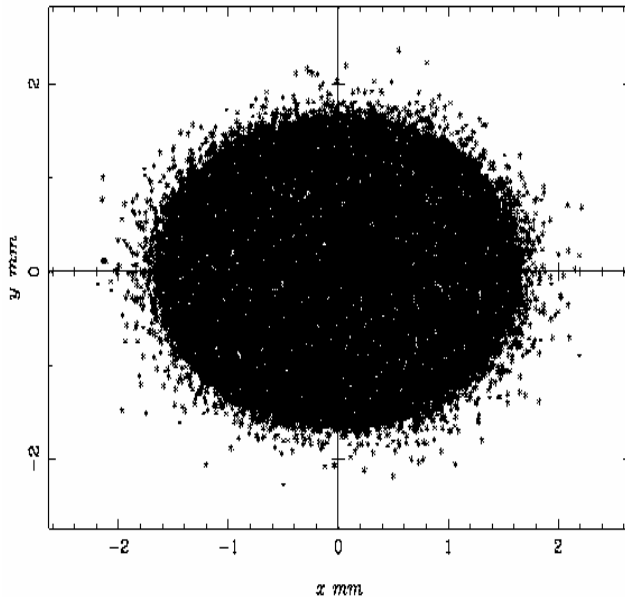
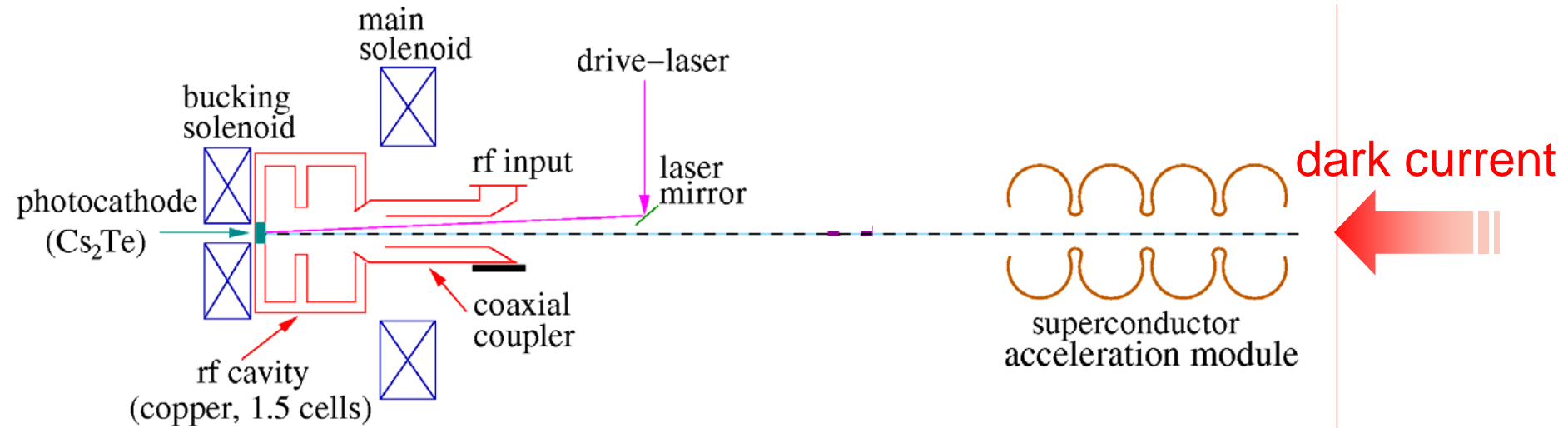
→ Dark current from the acceleration module?

→ Multiplacting at the cathode?

→ ???



More study is necessary.



50 MeV average E_{kin}
 4 mm radius radial
 ~1 RF cycle