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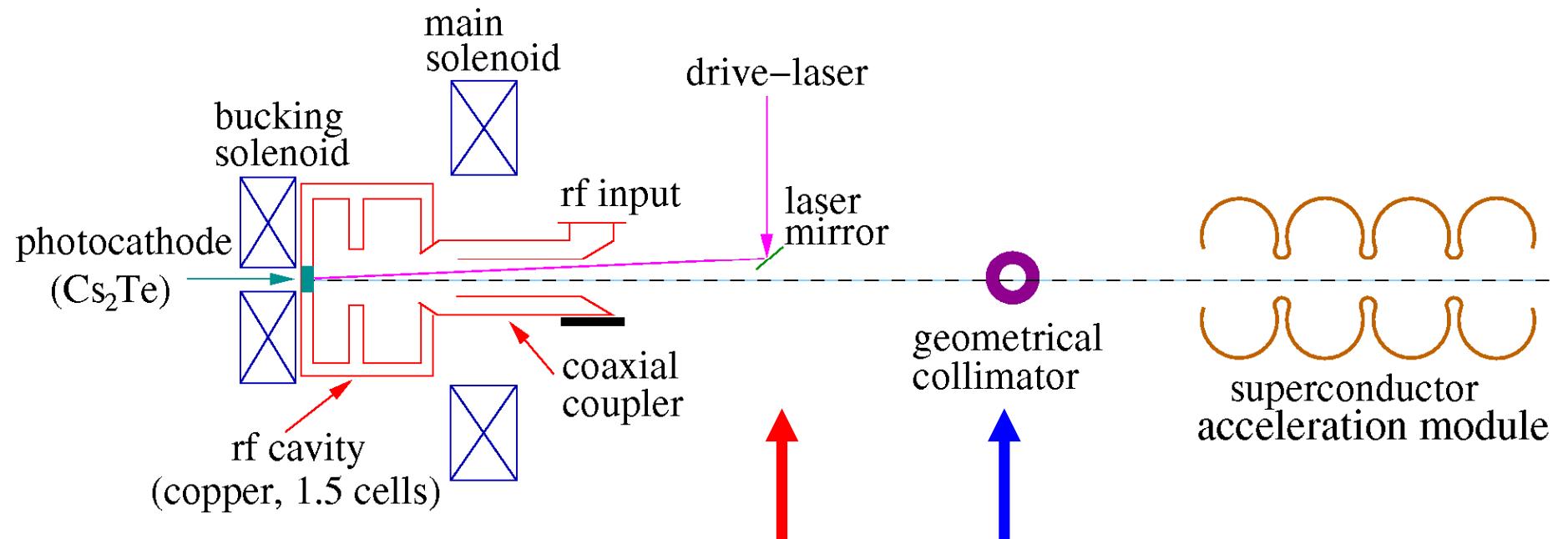
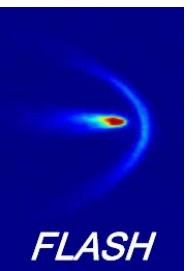
# Summary of Gun Study

Jang-Hui Han

FLASH meeting, 15 May 2007

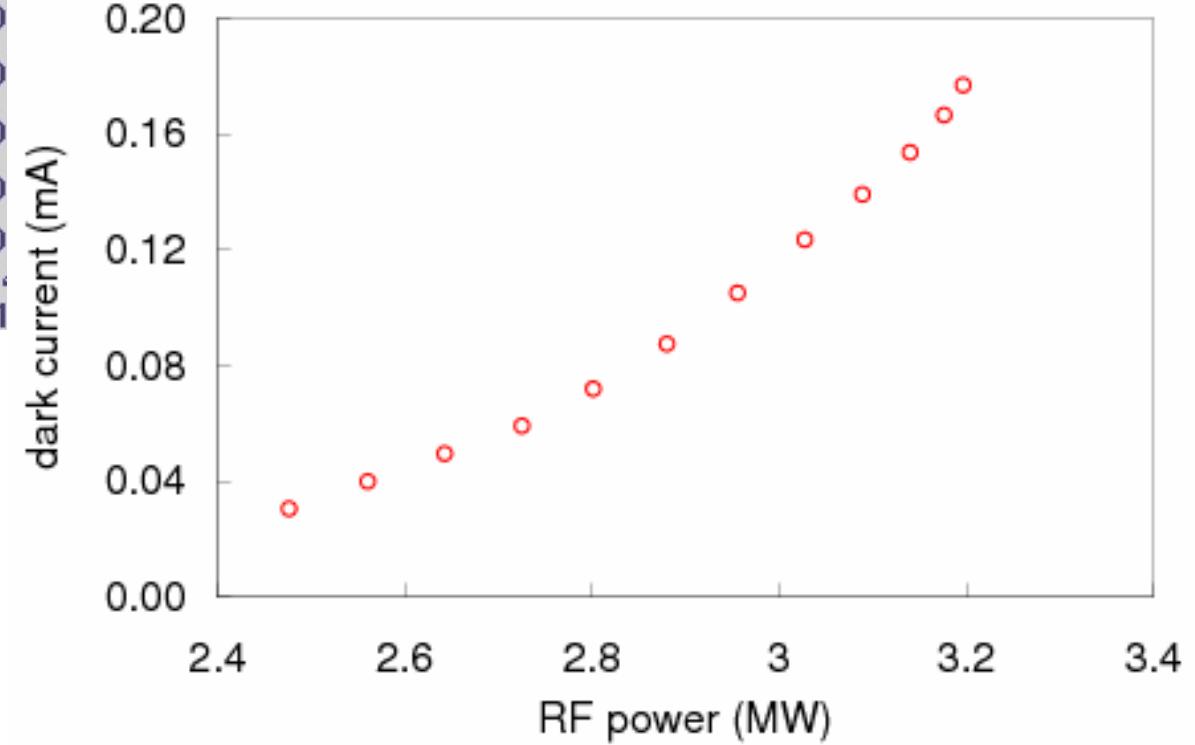
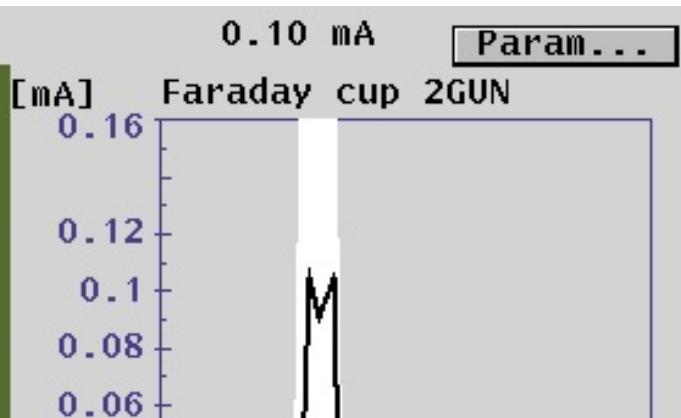
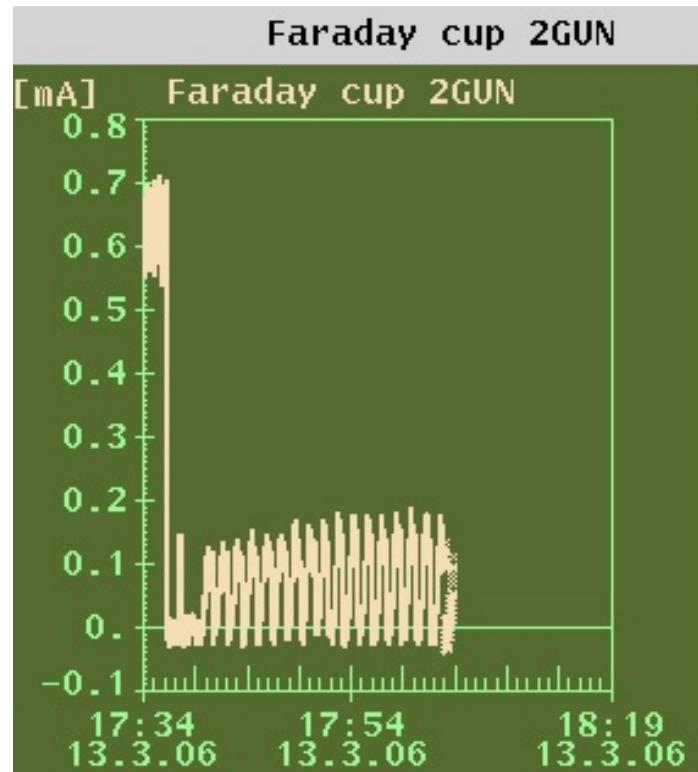
- Dark current
- Cathode damage

# Dark Current Measurement

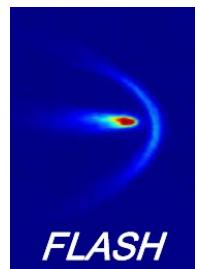


Faraday cups at **2GUN** & **3GUN**

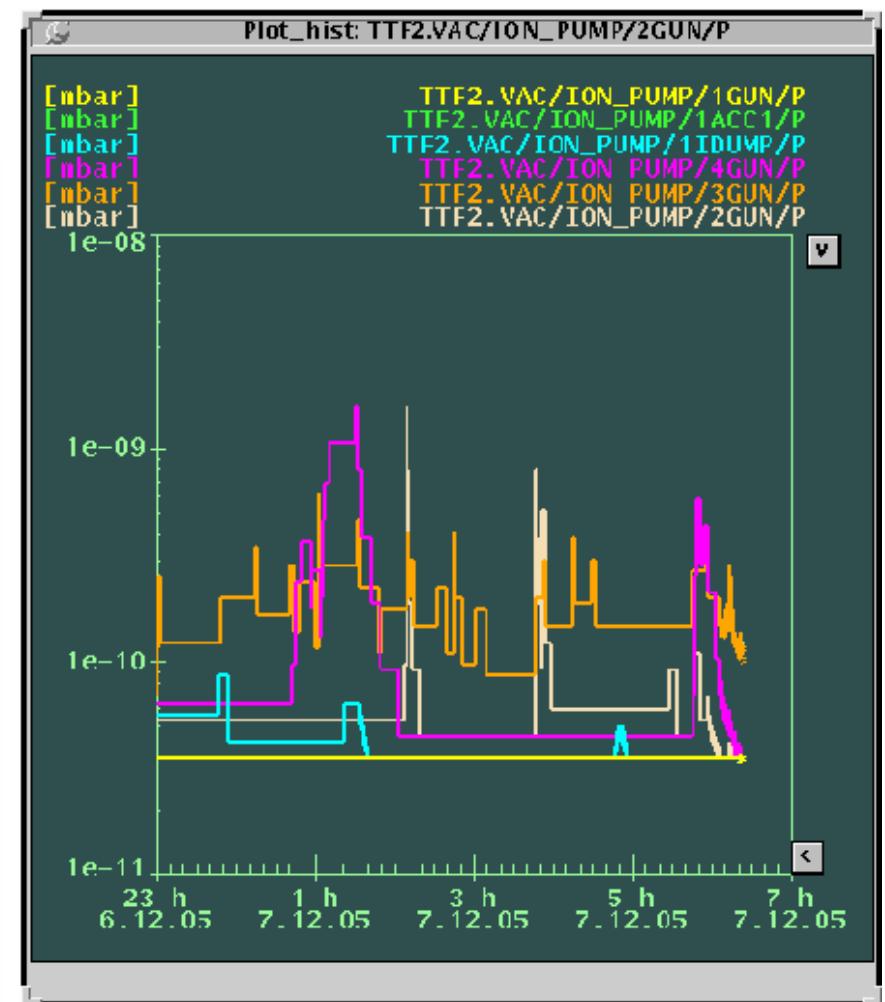
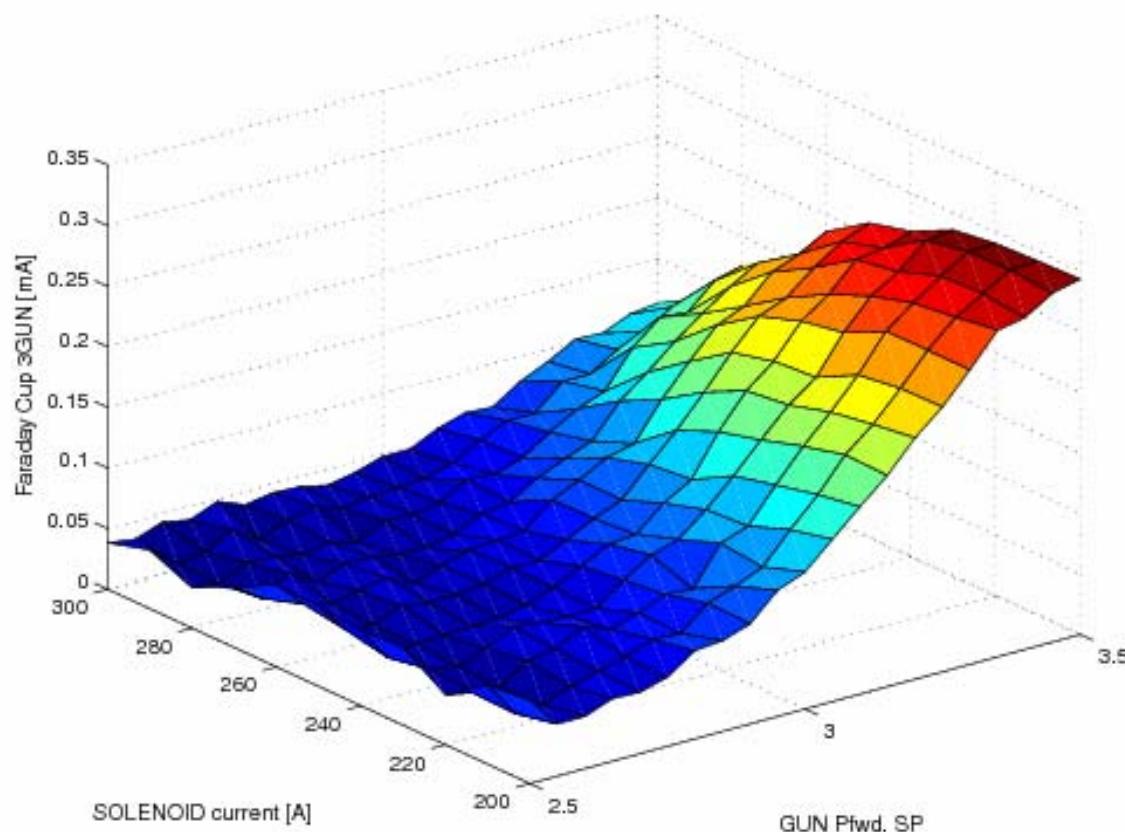
# DC Measurement (cont)



# DC Measurement (cont)

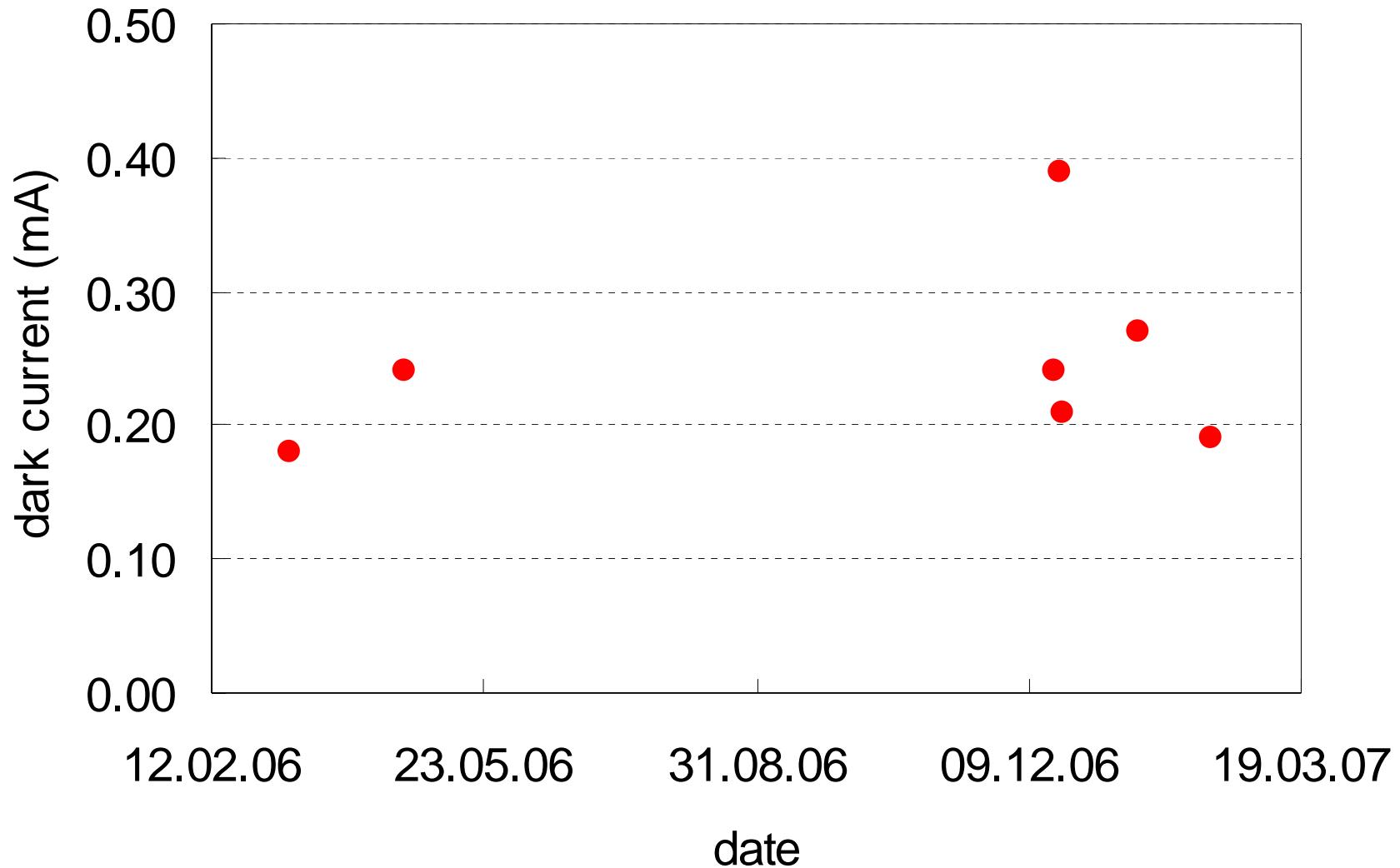


Measurement at 3GUN  
on 07 Dec 2005



# DC Measurement (cont)

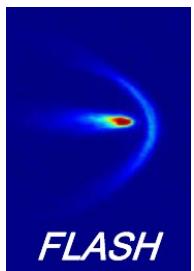
Measurement at 2GUN with SASE conditions



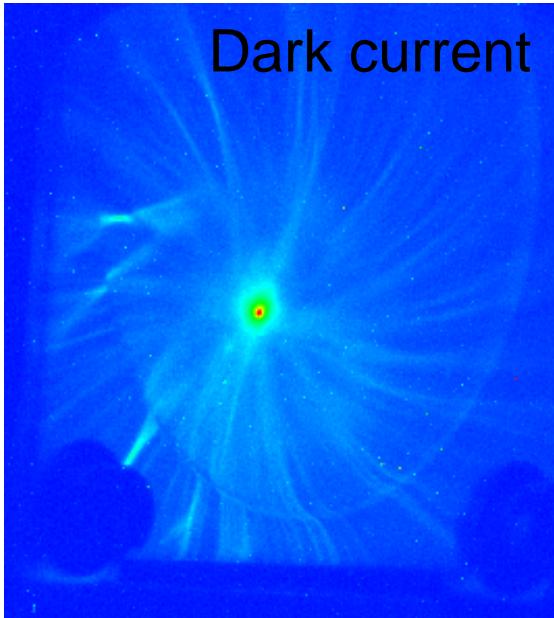


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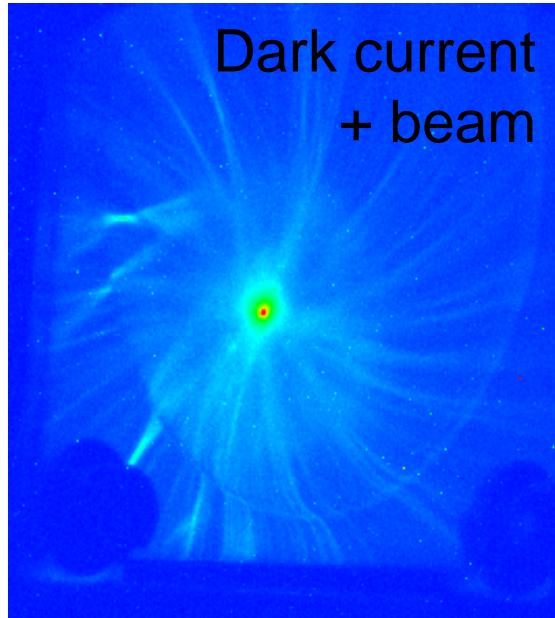
# Beam & Dark Current



Dark current



Dark current  
+ beam



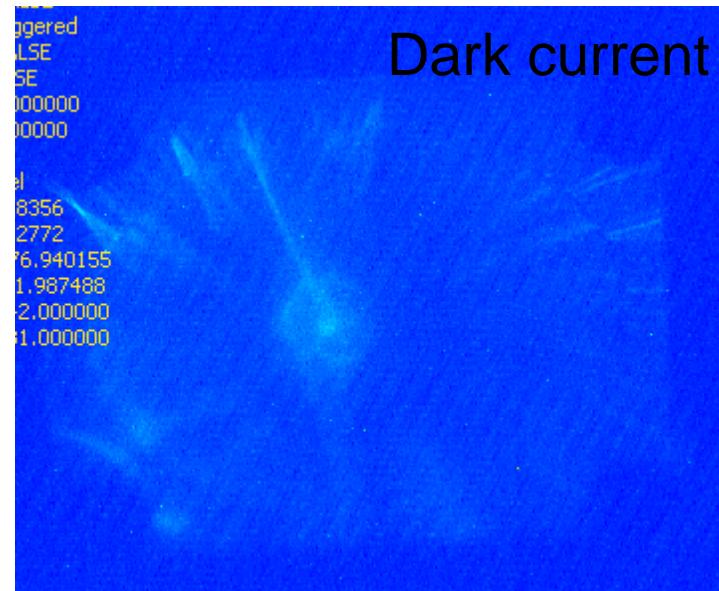
3.2 MW RF  
277 A main solenoid  
20 A bucking solenoid

2GUN

3GUN

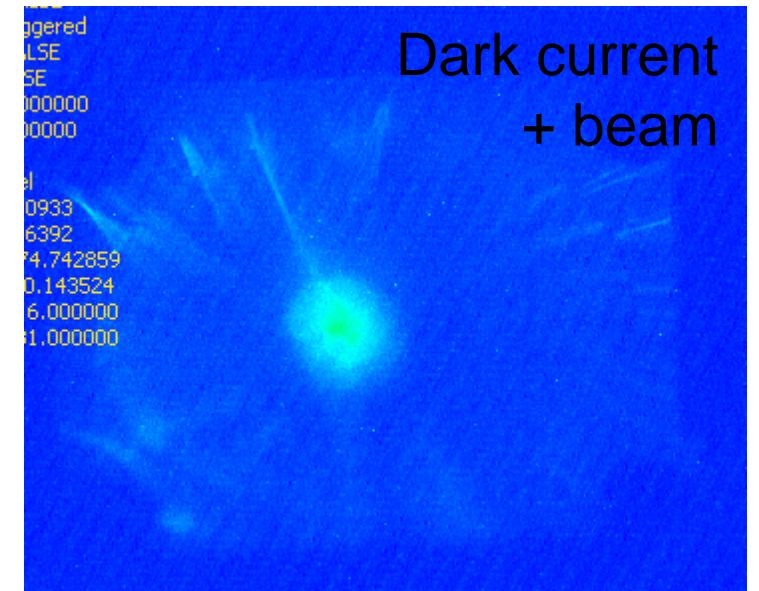
triggered  
ALSE  
SE  
000000  
00000  
  
el  
8356  
2772  
76.940155  
1.987488  
-2.000000  
-1.000000

Dark current



triggered  
ALSE  
SE  
000000  
00000  
  
el  
0933  
6392  
74.742859  
0.143524  
-6.000000  
-1.000000

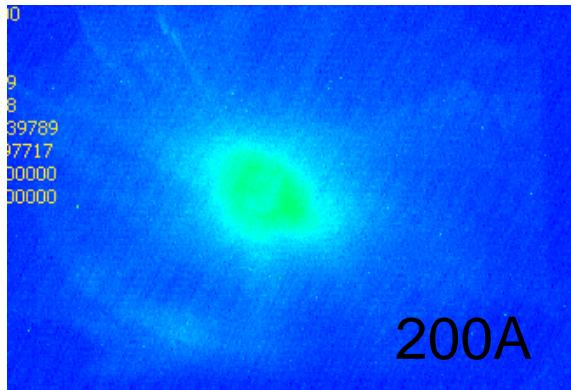
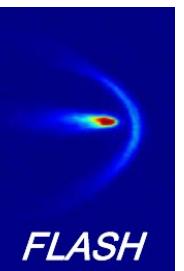
Dark current  
+ beam



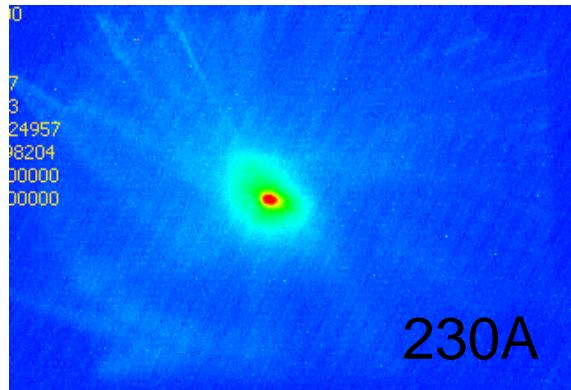


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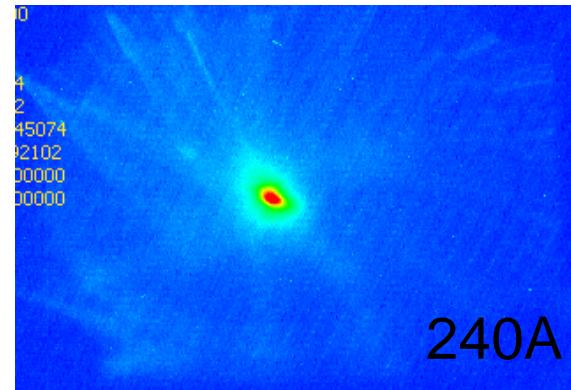
# Dark Current at 3GUN



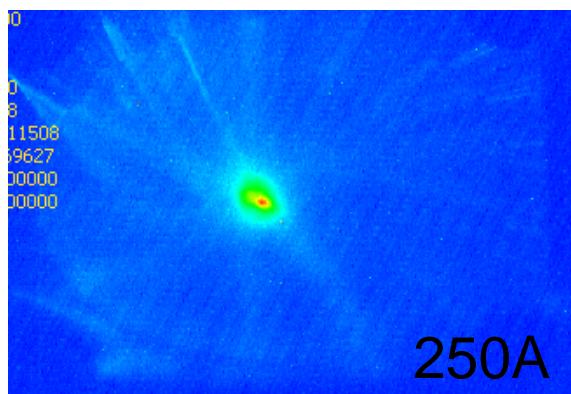
200A



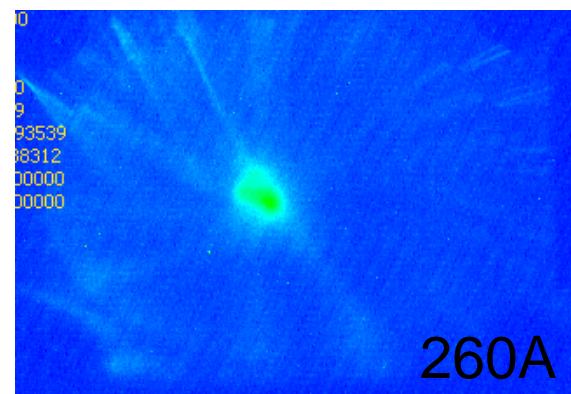
230A



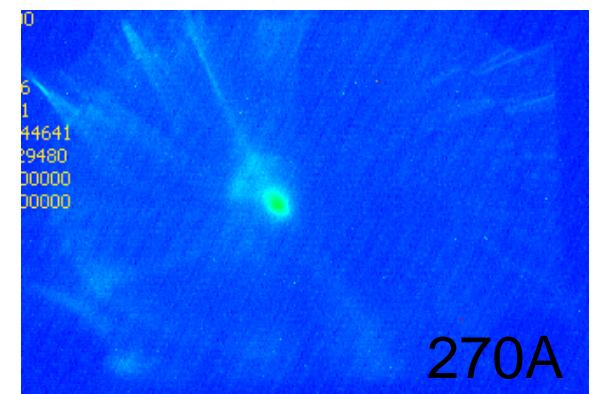
240A



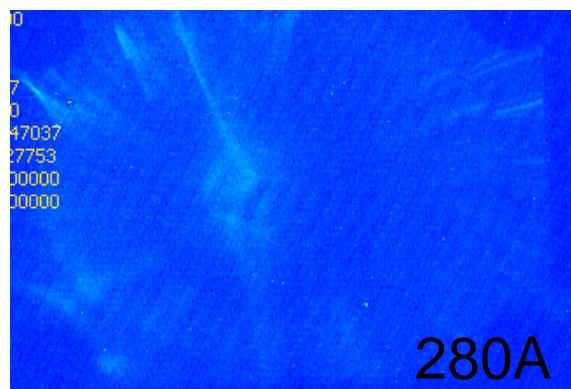
250A



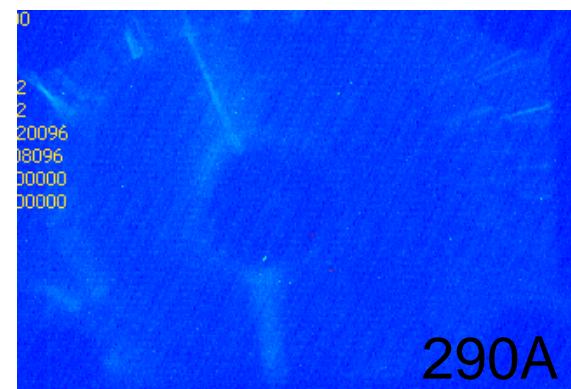
260A



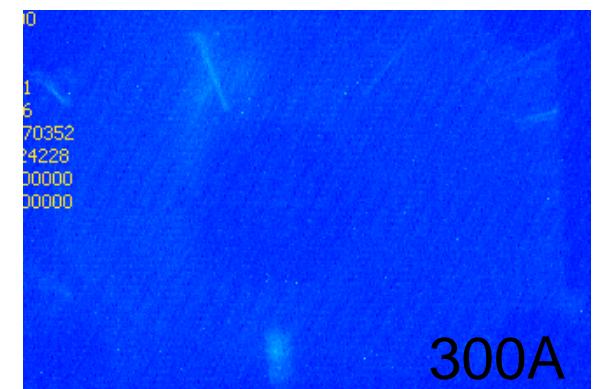
270A



280A



290A

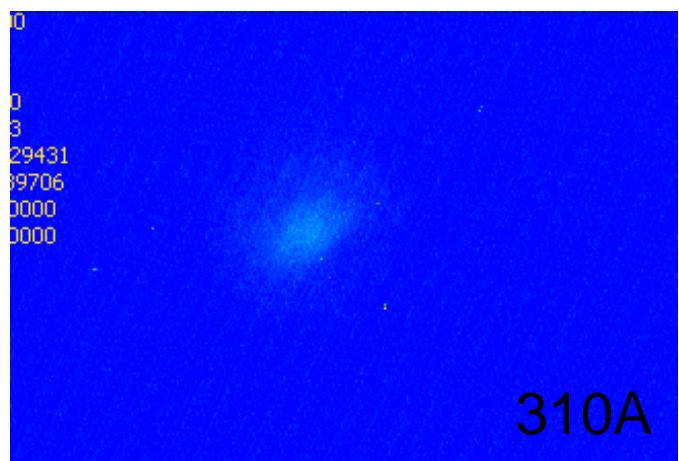
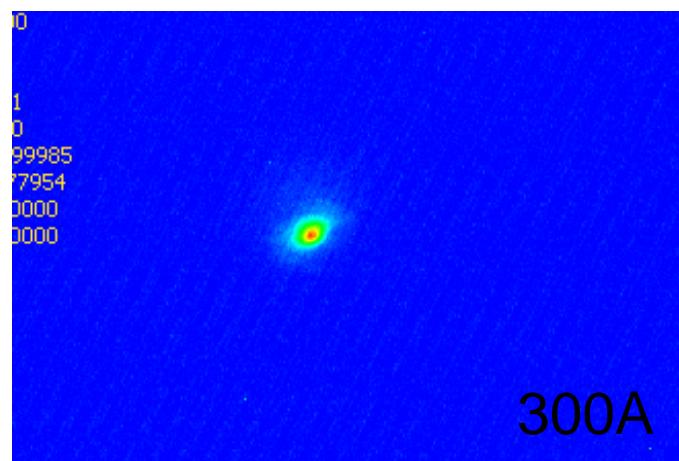
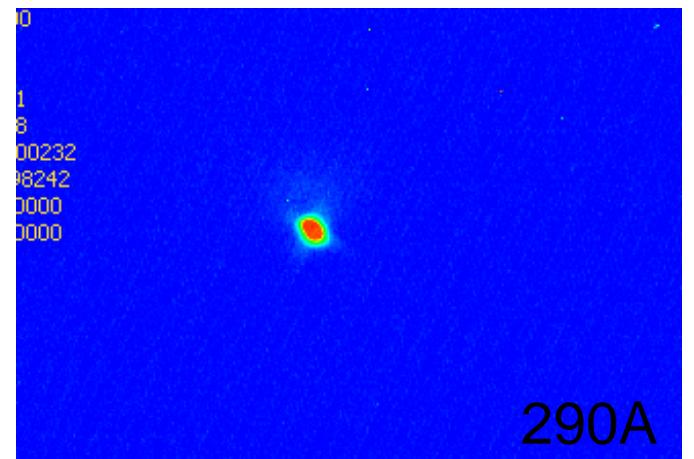
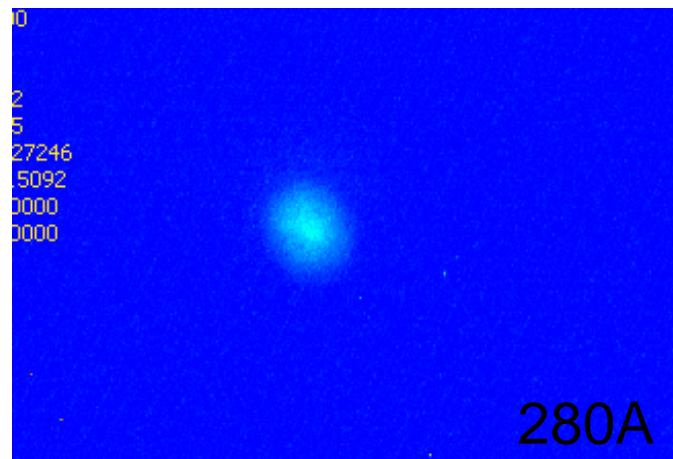
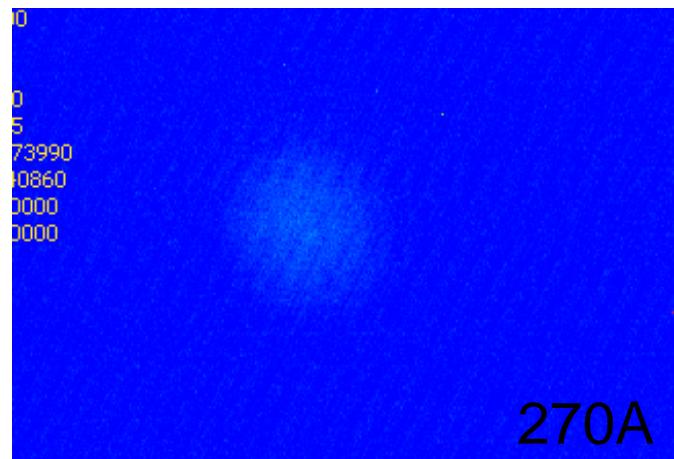
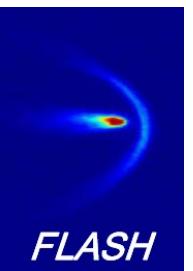


300A



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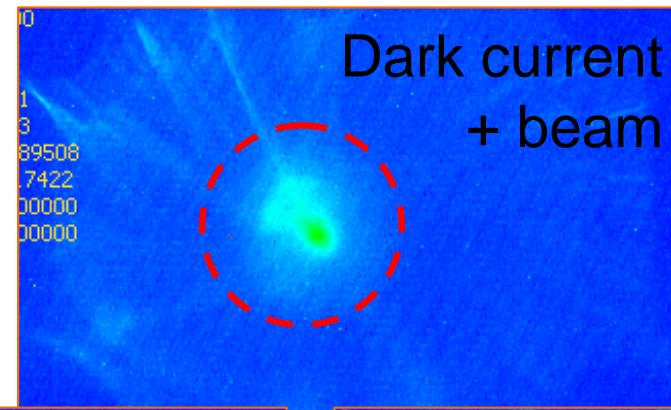
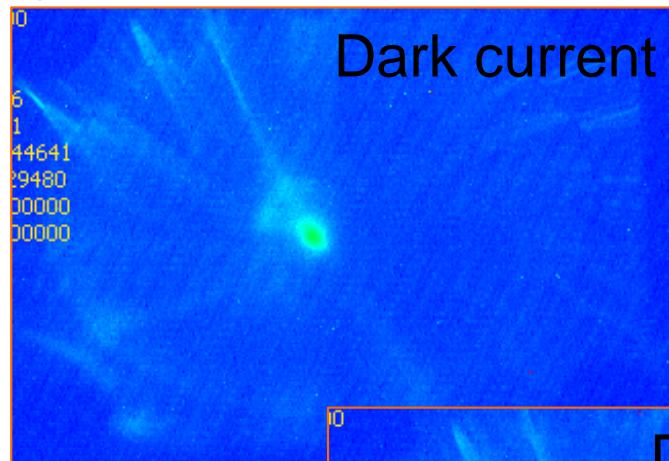
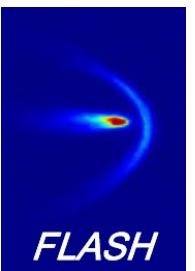
# Beam at 3GUN



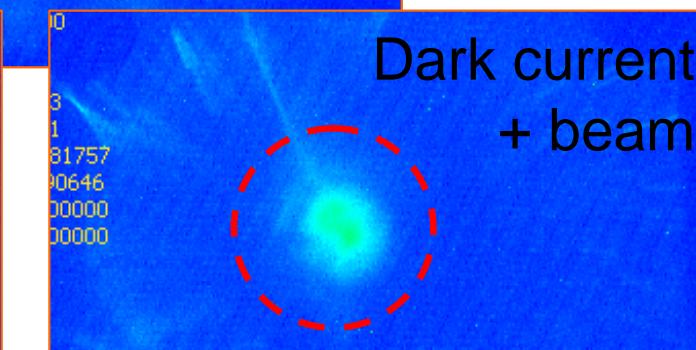
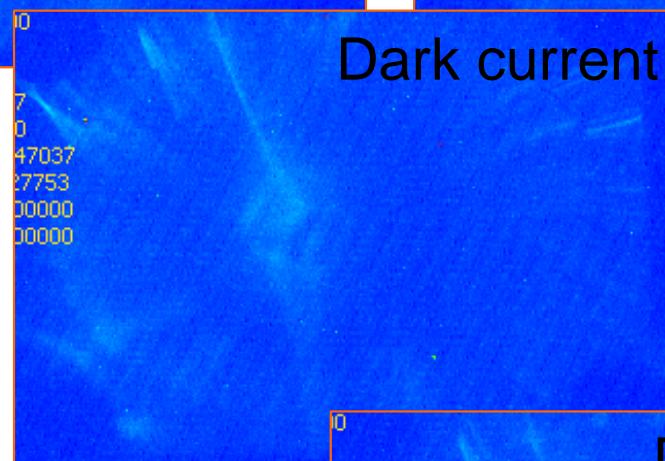


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# Beam + DC at 3GUN

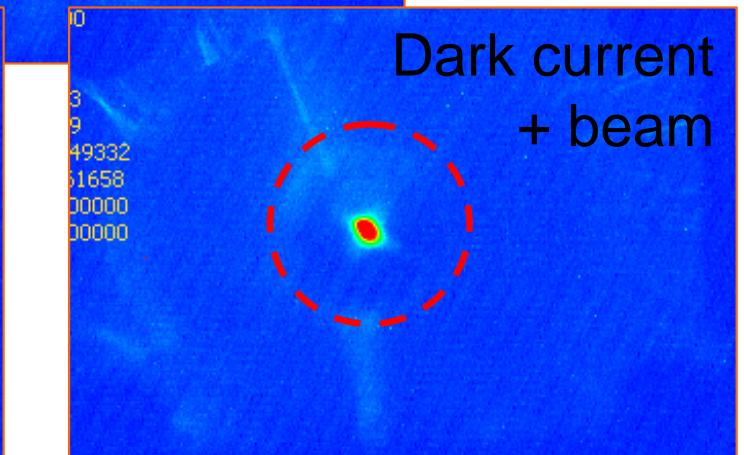
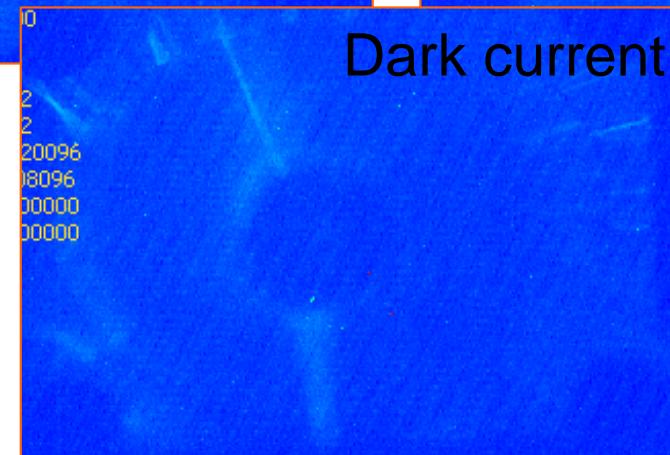


$$\leftarrow I_{\text{main}} = 270\text{A}$$



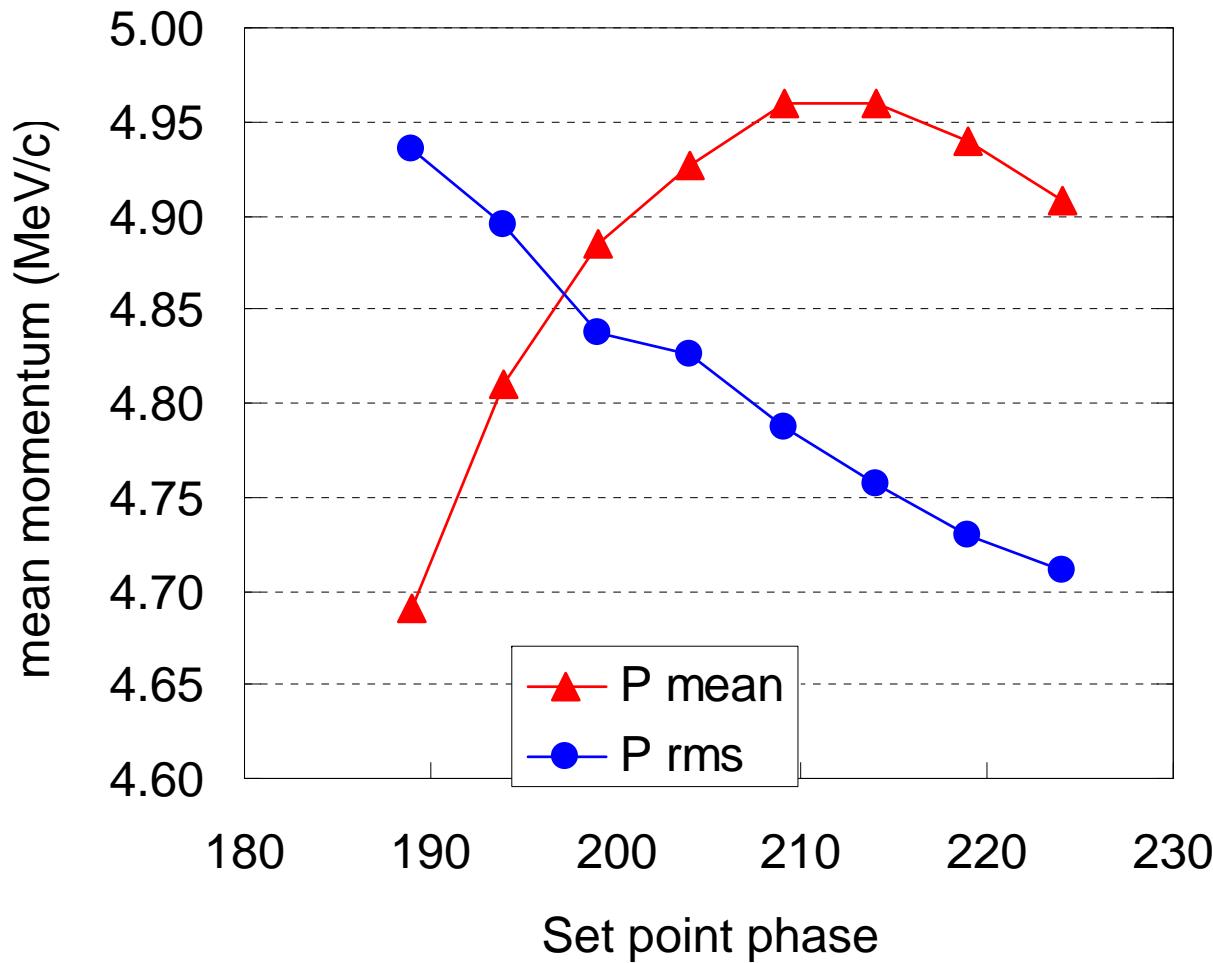
$$\leftarrow 280\text{A}$$

$$290\text{A} \rightarrow$$

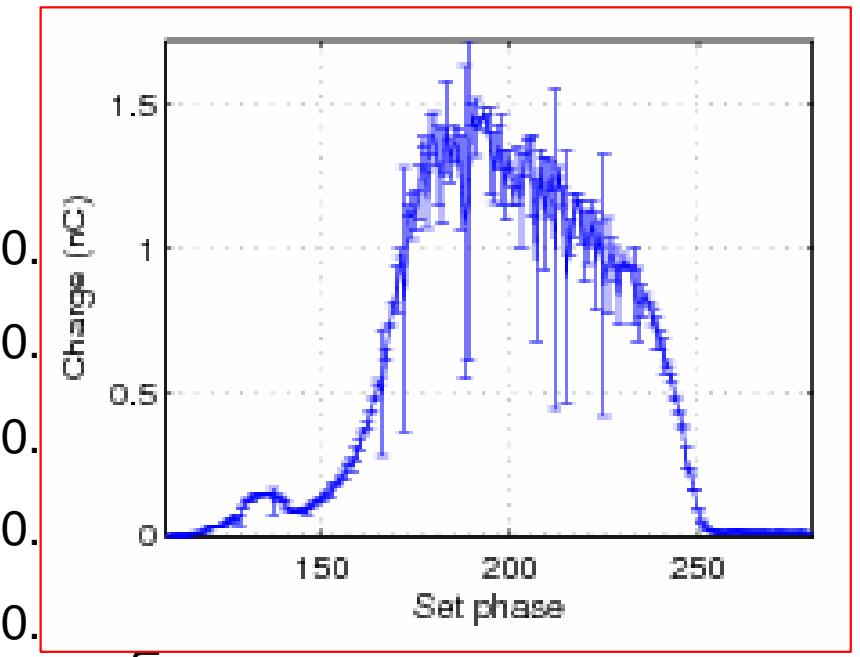


# Beam Vs RF Phase

Beam momentum Vs RF phase

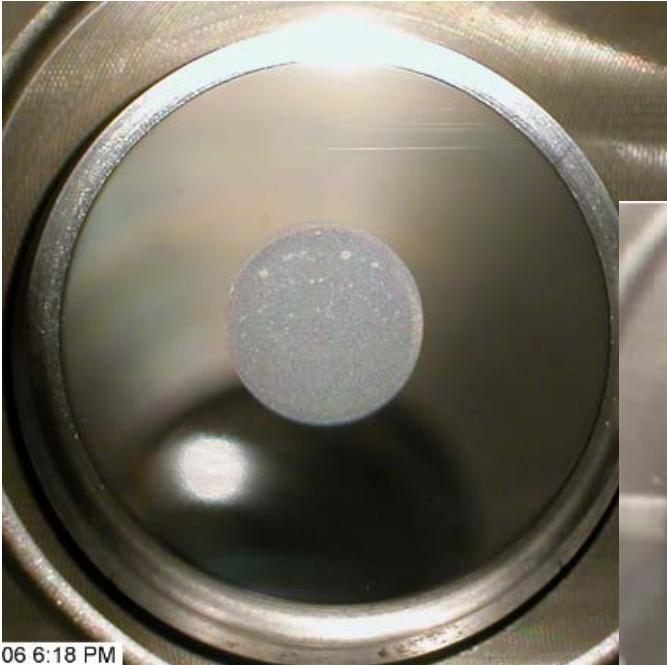
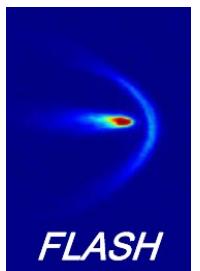


Bunch charge Vs RF phase



$P_{\text{fwd}} = 3.17 \sim 3.29 \text{ MW}$

# Cathode Damage of #77.1



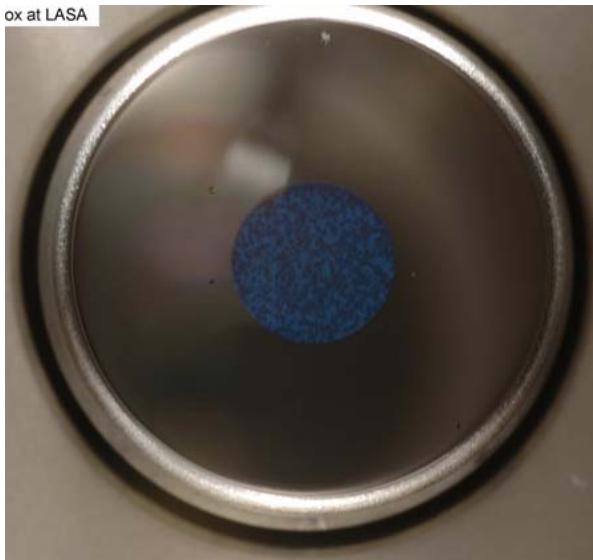
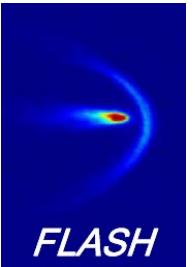
New (at LASA)



Used 11 July – 24 October 2006



# Cathode Damage (cont)

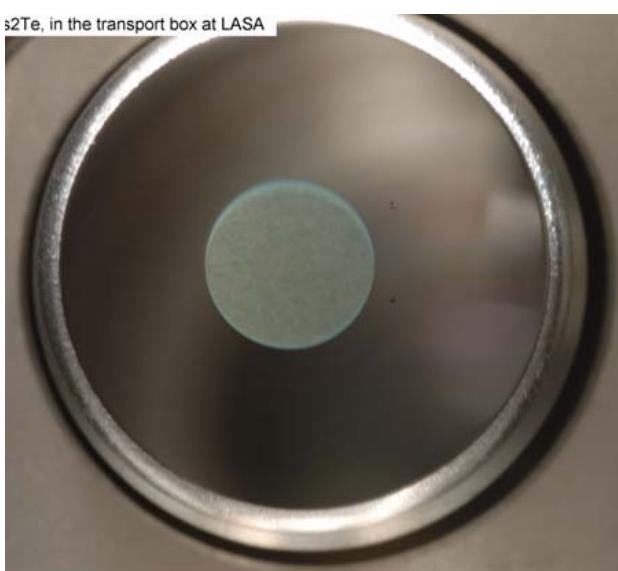


# 13.3  
3 Nov 2006 –  
12 Dec 2006

← New (at LASA)



After use →



# 92.1  
12 Dec 2006 –  
7 Feb 2007  
(XPS at BESSY)

← New (at LASA)



After use →

# Cathode Damage (cont)

2Te, in the transport box at LASA



# 94.1  
7 Feb 2007 –  
13 Mar 2007

← New (at LASA)

After use →



Te, in the transport box at LASA



# 95.1  
13 Mar 2007 –  
25 Mar 2007

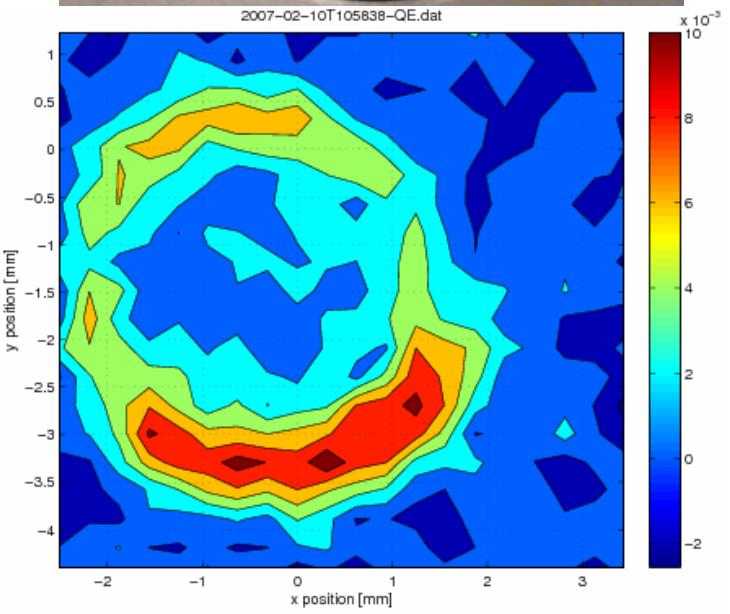
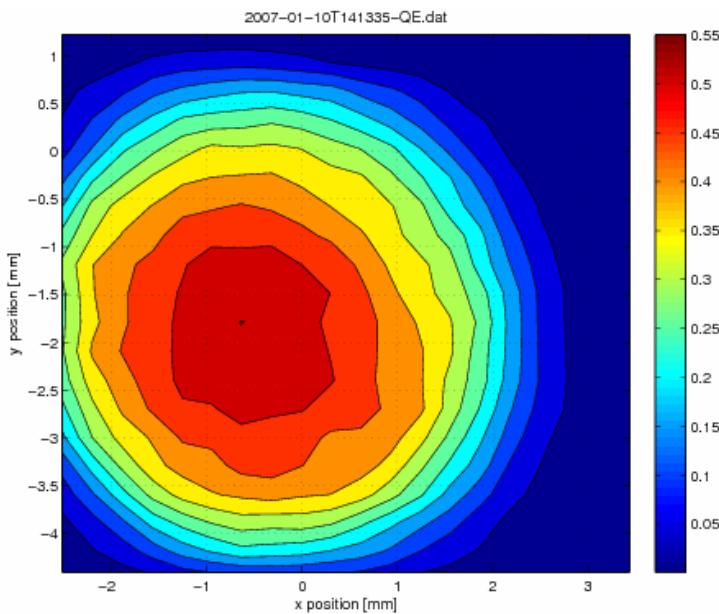
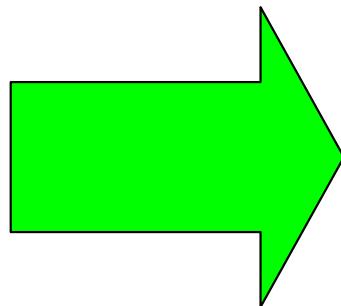
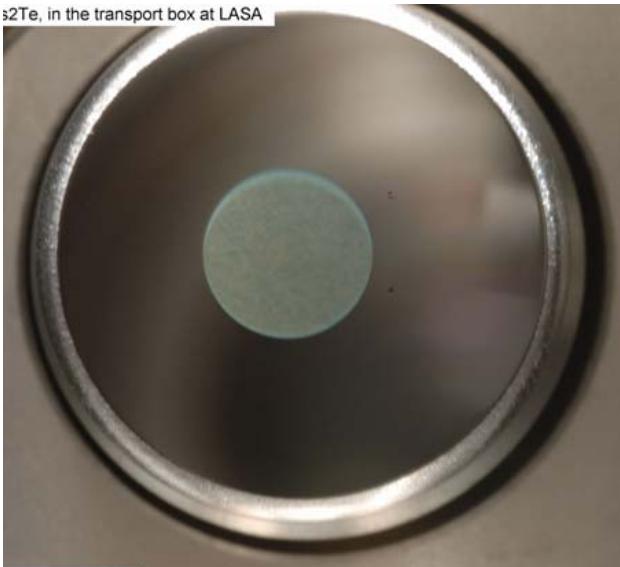
← New (at LASA)

After use →



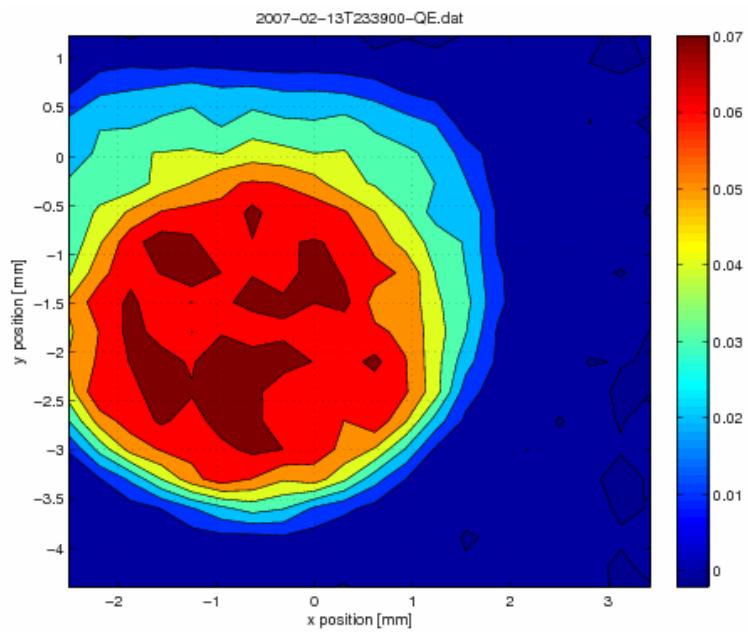
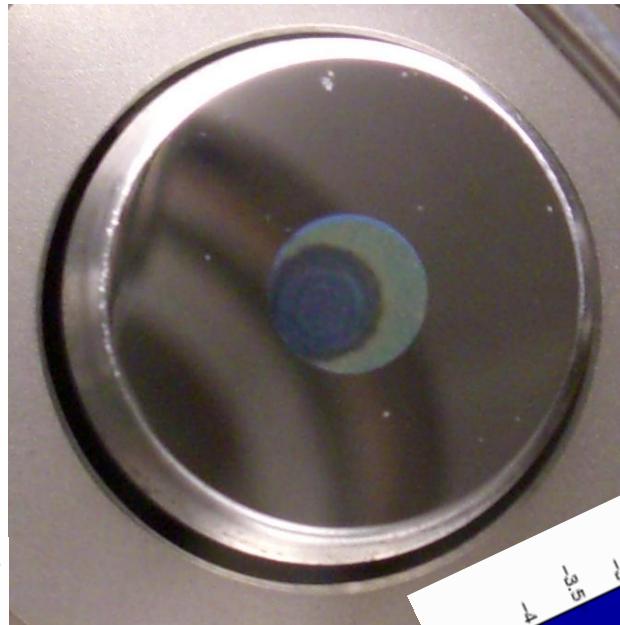
# Damage of #92.1

s2Te, in the transport box at LASA

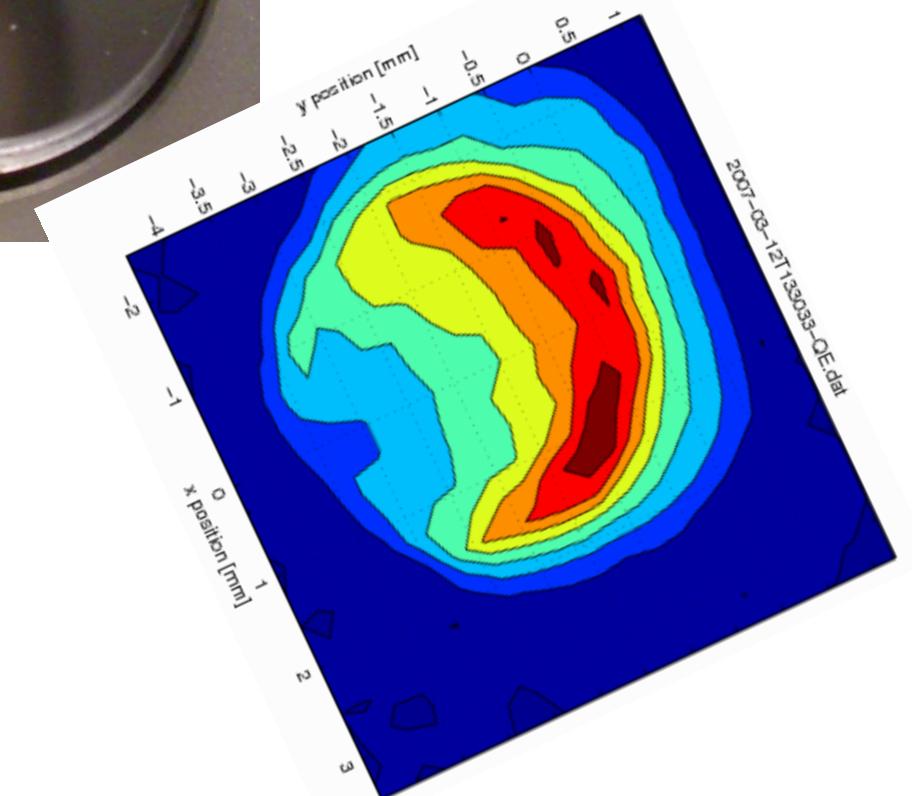


# Damage of # 94.1 (1)

Used for  
3 weeks user run  
3 weeks FEL study

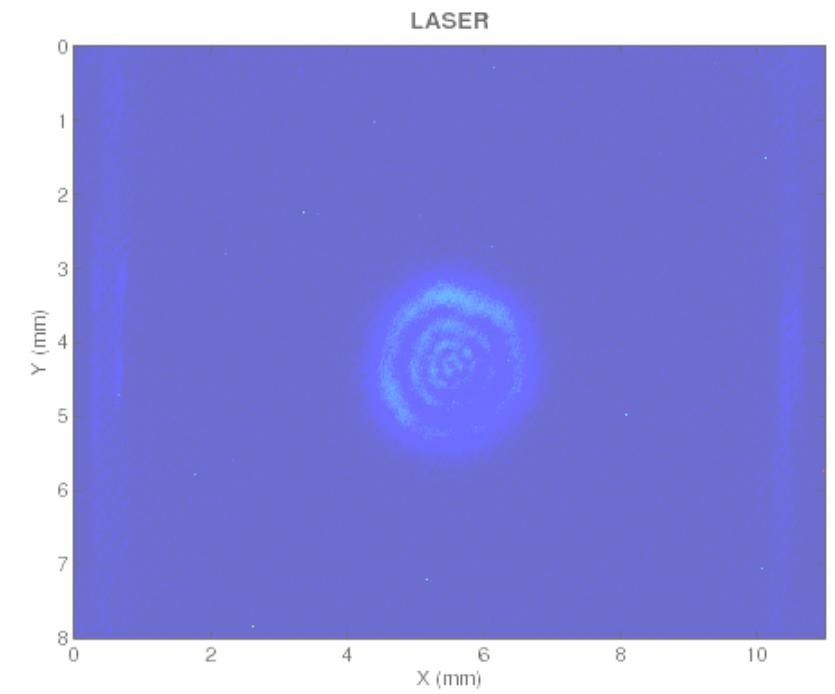
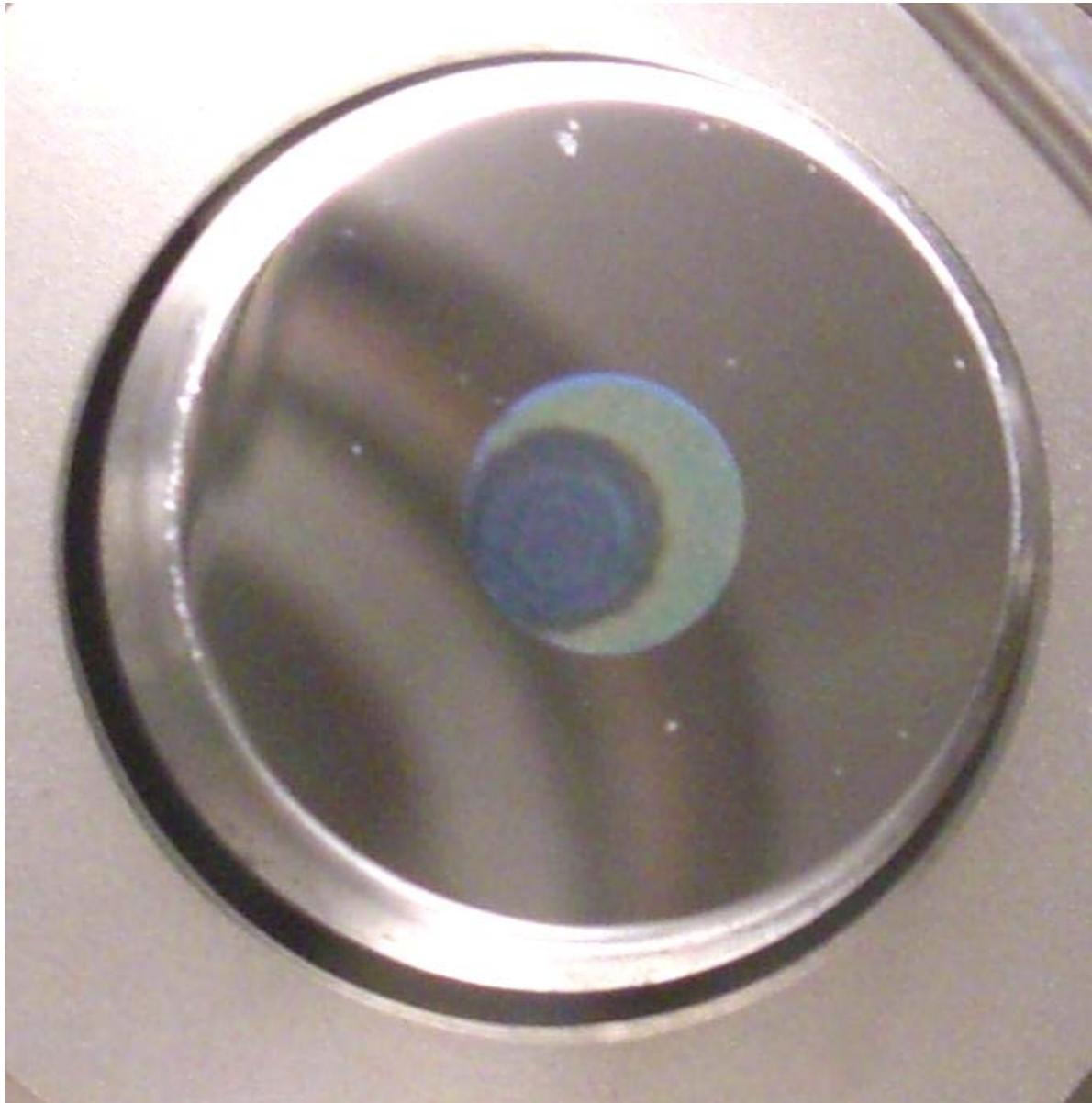


14 Feb 2007



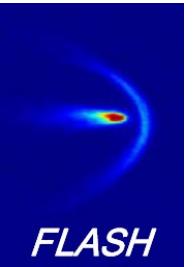
12 Mar 2007

# Damage of # 94.1 (2)



Laser on 12 March 2007

# Summary



- Dark current is monitored.  
→ no dramatic change observed
- Fast cathode damage observed  
→ seems to be related to cathode laser and dark current from ACC1
- New working condition should be searched after this maintenance.