

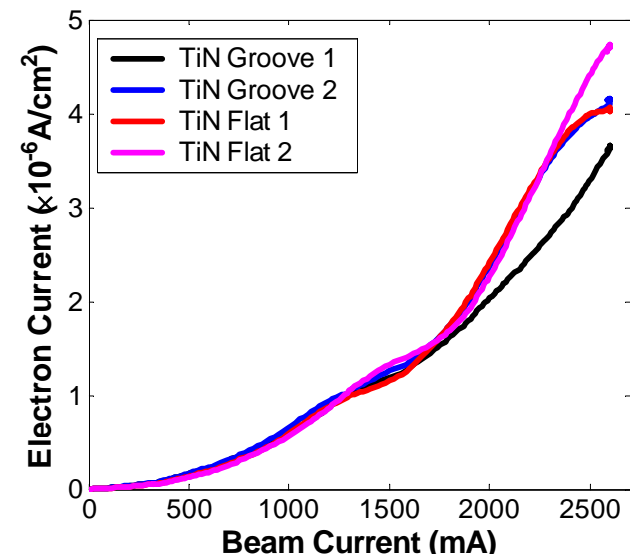
Estimation of the Primary electrons (photon-electron)

Method:

1. Normalized electron current by the calculated photon-flux at each collector
2. Compare the electron current at low beam current, where there is no multipacting

Results (relative Photon electron same amount of photons):

1. Flat 1 : 1.0
2. Flat 2: 0.8 (why 20% smaller than Flat 1)
3. Groove 1: 0.055 (1/18.26) ← Photo factor
4. Groove 2: 0.055 (1/18.35)

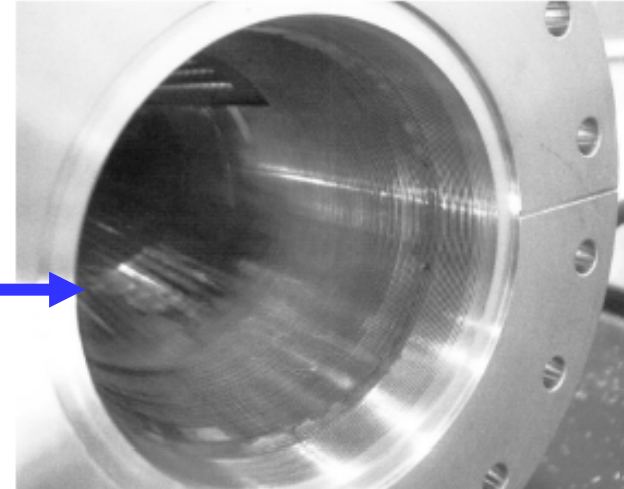


Examples of Reduction photon electron

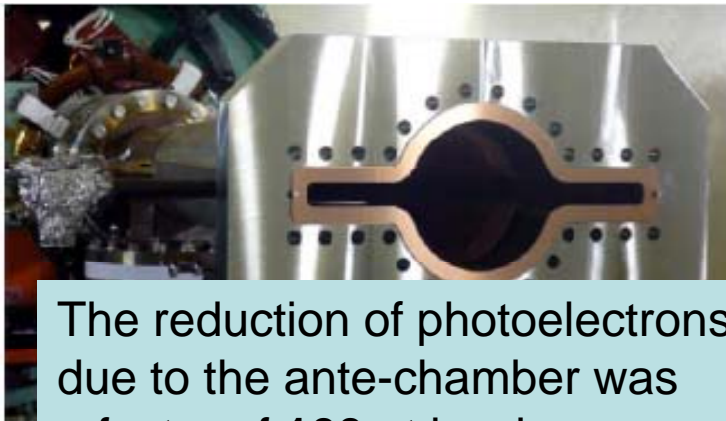
Sawtooth surface

Application of a sawtooth surface to accelerator beam chambers with low electron emission rate by Y. Suetsugu, et al., J. Vac. Sci. Technol. A 21(1), 186 (2003).

The reduction was by a factor of **24~27**



Ante_chamber (Y. Suetsugu, et. al. EPAC2006)



The reduction of photoelectrons due to the ante-chamber was a factor of **100** at low beam current! **KEKB upgrade plan**

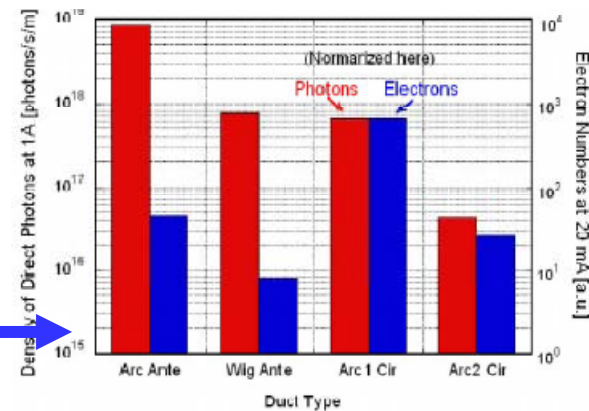
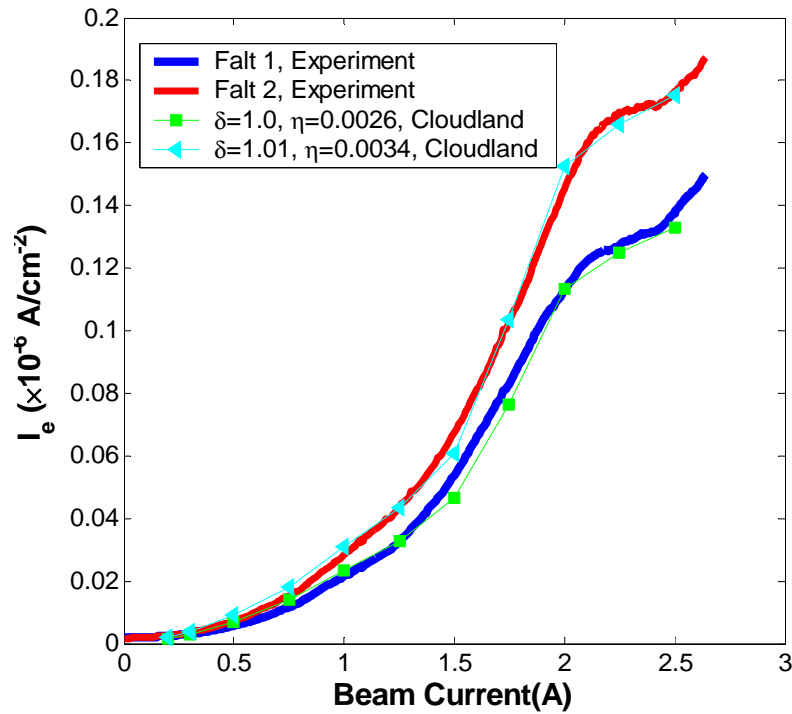
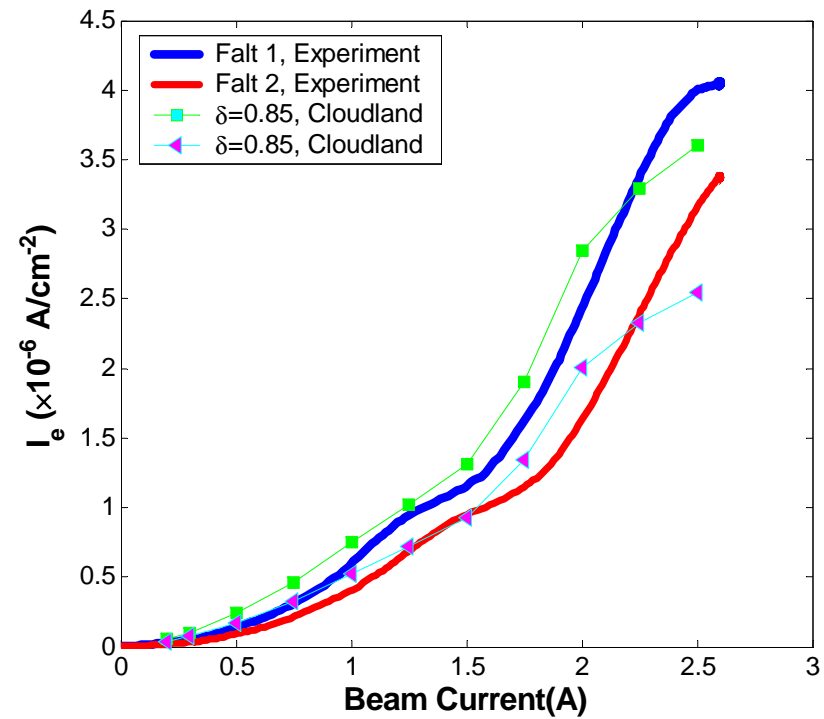


Figure 3 Comparison between measured electron numbers and line densities of direct photons for four types of beam ducts. The electron numbers were normalized to photon numbers at "Arc 1 Cir".

SEY estimation



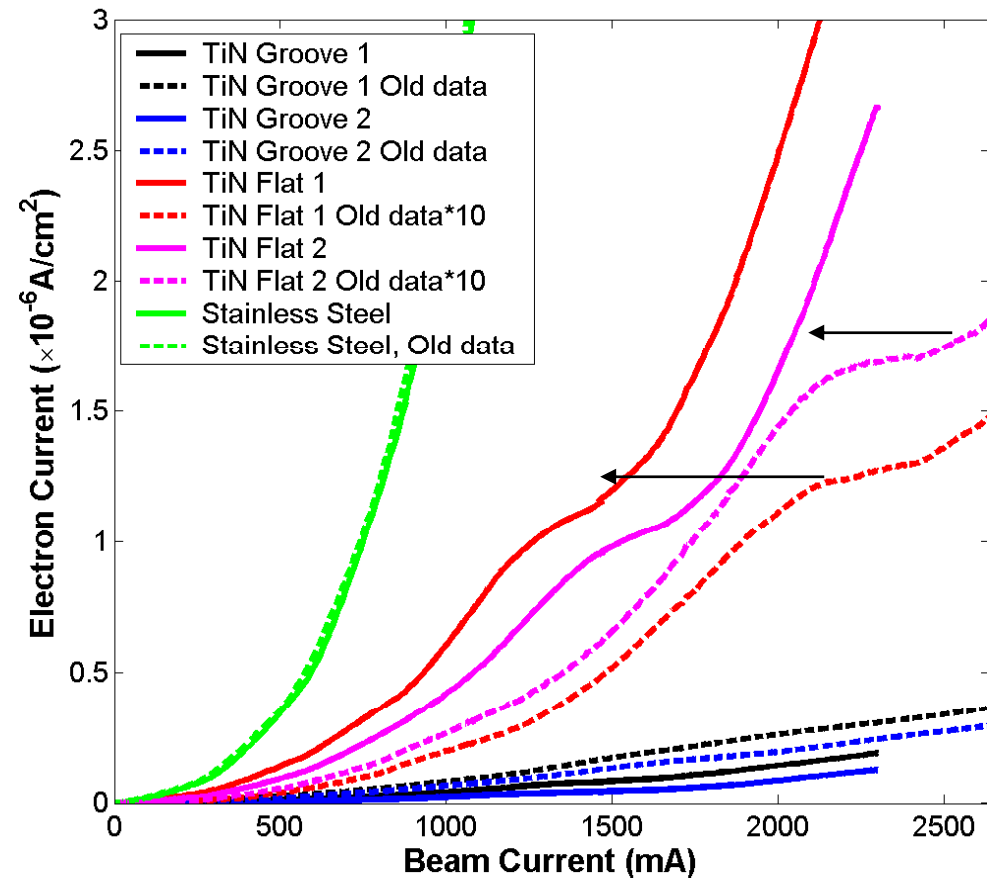
Before alignment



After alignment

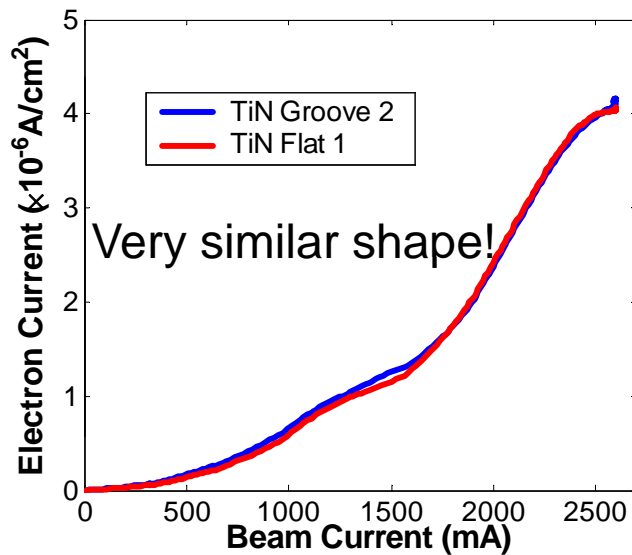
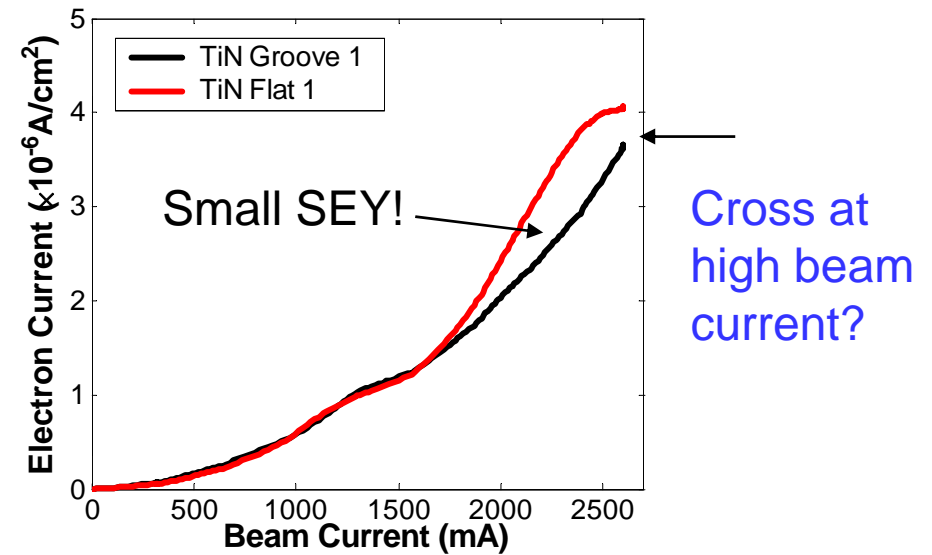
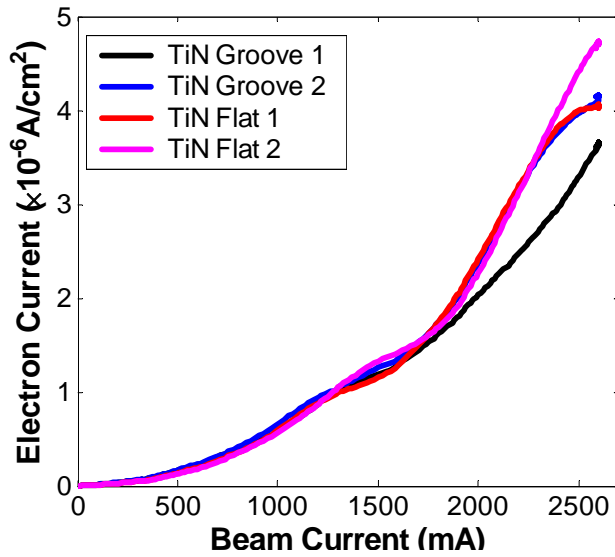
Fitting after alignment

- E-current in the flat chambers increases by a factor >10 ; the shape also changed!
- However, We don't have clear reason to change the shape of e-current line in simulation.

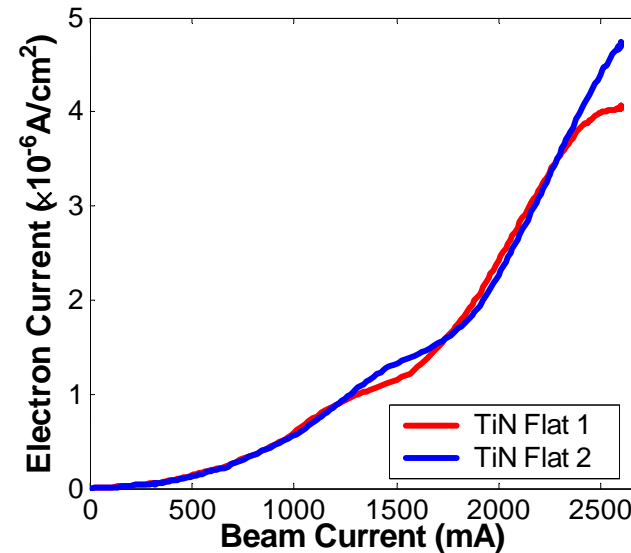


E-current line shape—(SEY)

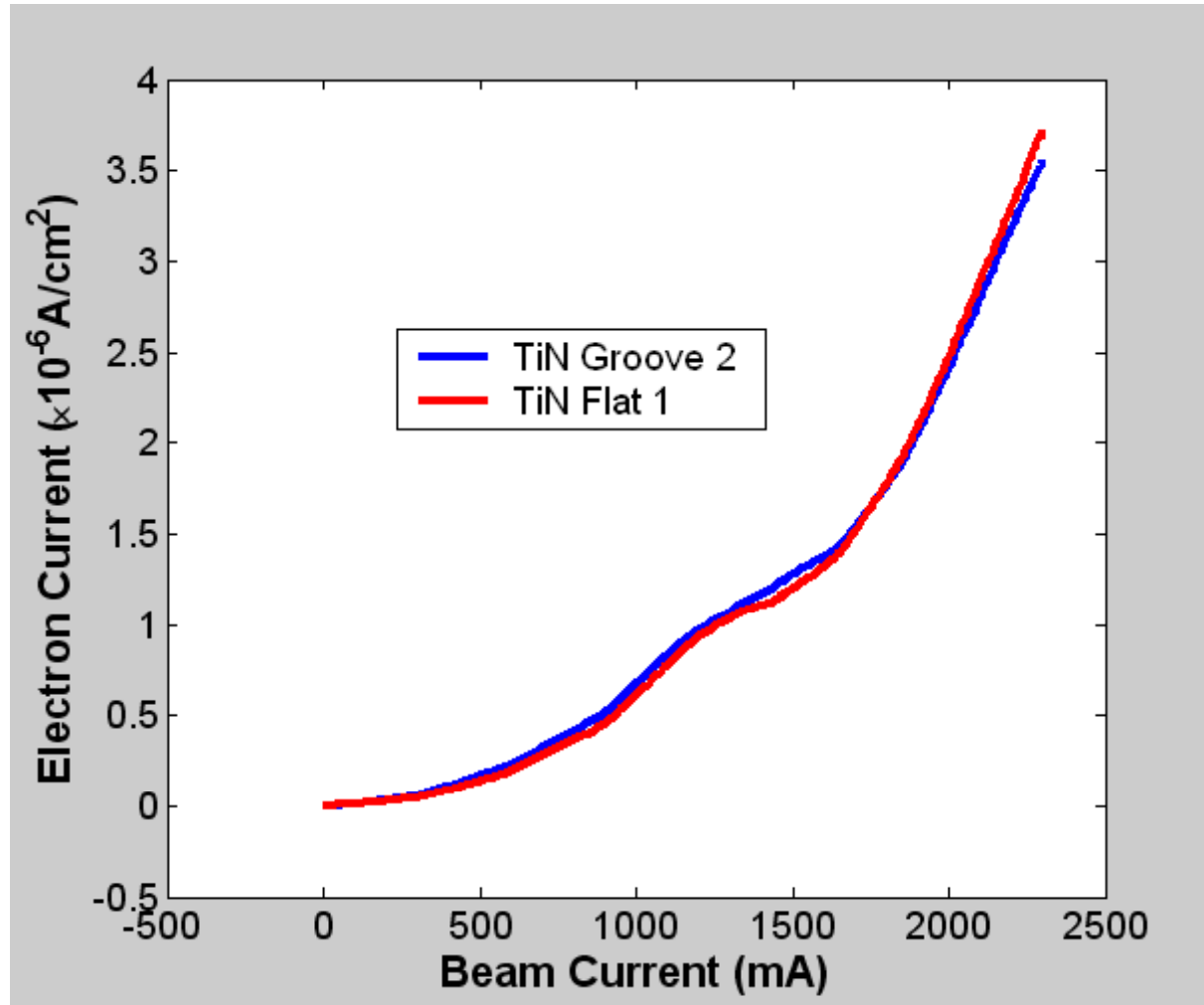
07-31-data



) mee



Data 07-25-2007



SLAC ILC R&D meeting Oct. 29, 2007

Summary

➤ The e-current in grooved chamber is 18 times smaller than the e-current in flat 1; the effect of rectangular surface is similar as the sawtooth surface.

➤ There is no significant secondary electron (SEY) reduction in grooved chambers

Chamber	Normalized Primary electrons	SEY reduction
Flat 1	1	
Flat 2	0.8	
Groove 1	1/18	some ¹
Groove 2	1/18	No

1. Electron current at high beam current (Groove 1 chamber)

2. What is the difference of groove 1 and Groove 2?