

Sensor Edge Acute Damage Test

Definitions used in collimator development

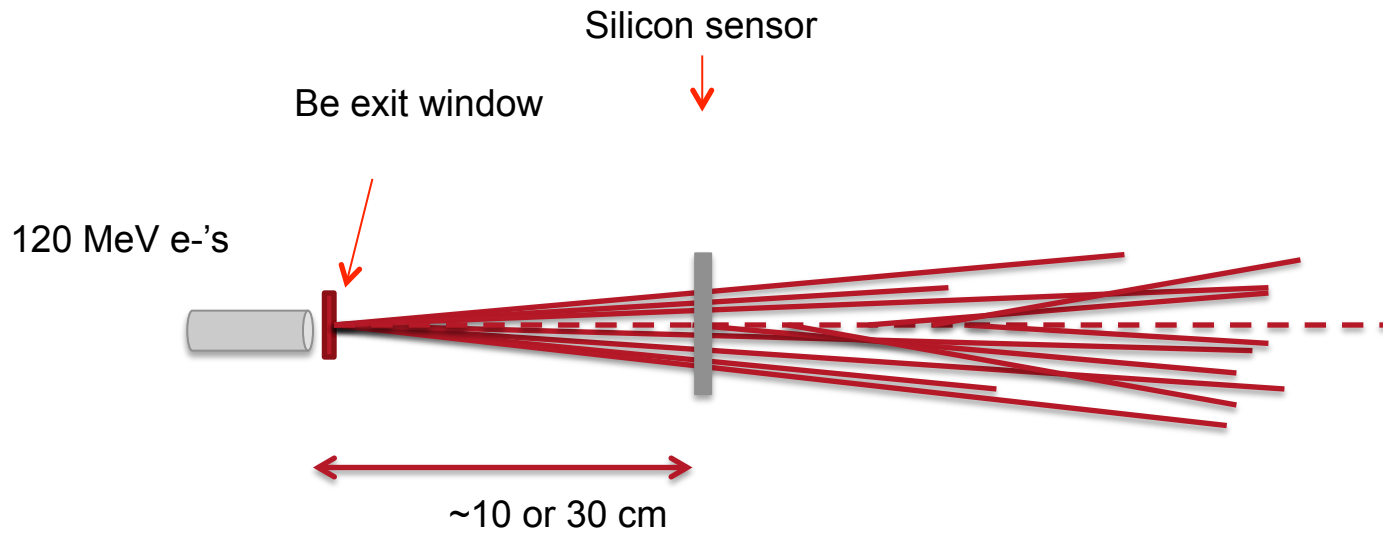
- Active region: 1.5mm from beam center i.e. 1mm from sensor cut edge?
- Guard ring area: anything between sensor cut edge and 1mm into the sensor

With new collimator option:

- $\sim 3 \times 10^8$ e- in 40usec on “guard ring area” (<1.5mm from beam center?)
- $< 10^3$ e- in “active region” (>1.5mm from beam center)
- What is the distribution as a function distance from sensor edge?

Test for issues with guard ring exposure

- Initial option: expose edge to large bunch charge in NLCTA beam
- Want to reach $> 10^8$ e-/bunch in the guard ring area: 10-100pC
- Can we make the beam small enough?
- (Option 2 is go to ESTA)

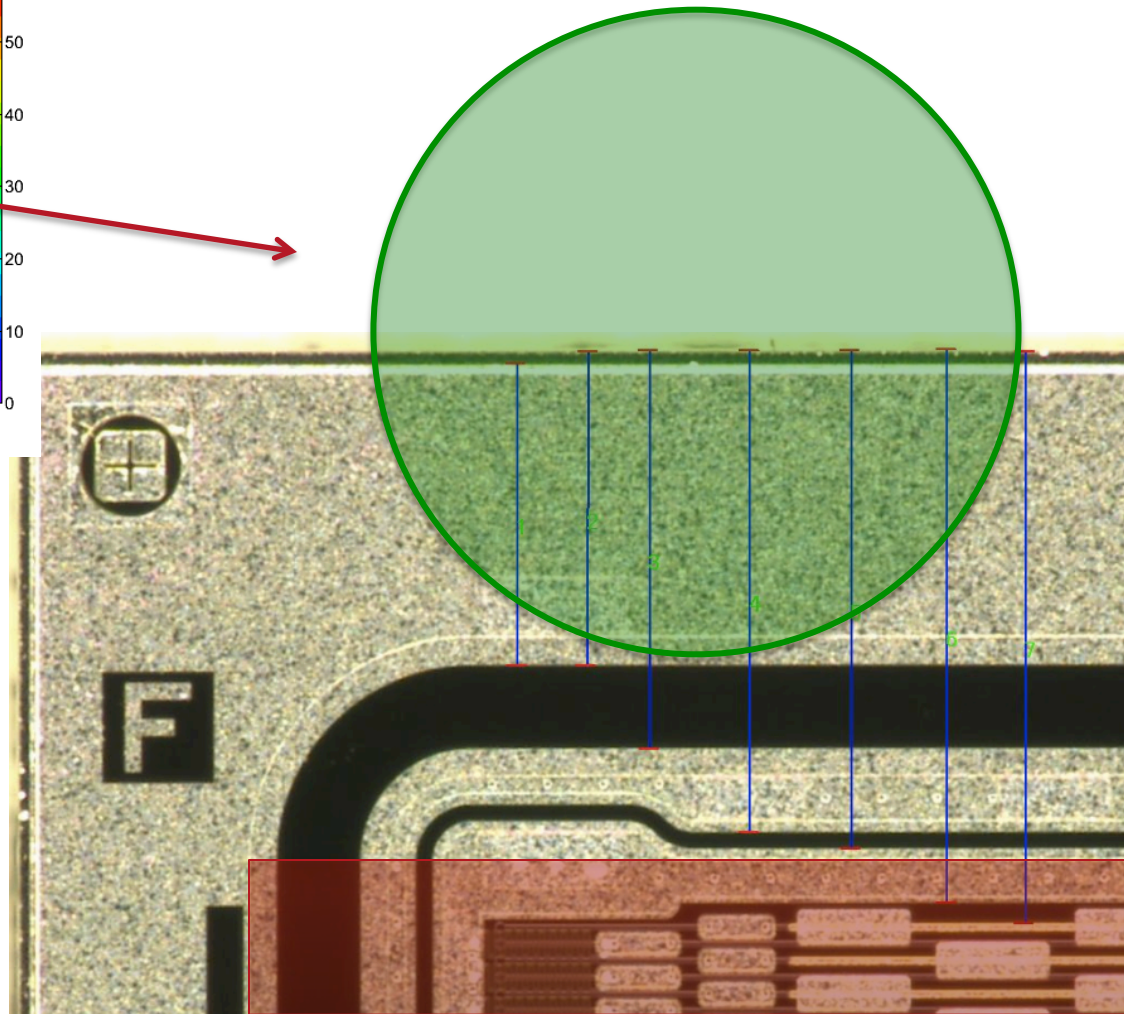
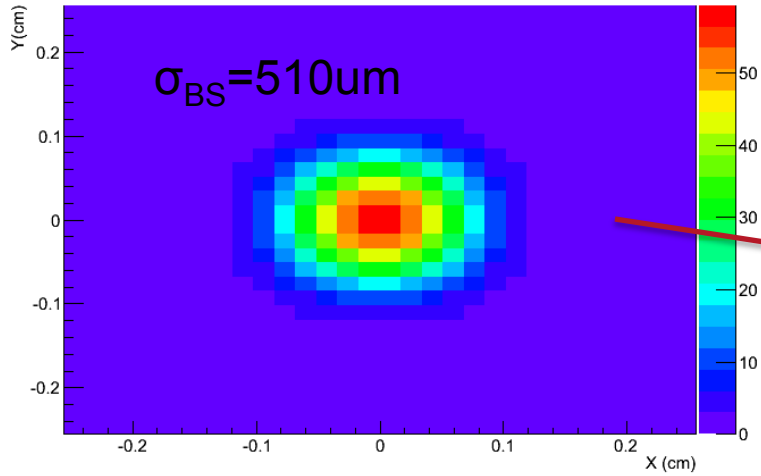


Close to thin exit window: dominated by achievable beam spot size

No optimization done yet; estimates range $\sigma=200-500\mu\text{m}$

NLCTA Beam Spot

Air: $\sigma_{BS}=500\mu\text{m}, d=10.0\text{cm}, t=1.417\text{e-}04X_0$

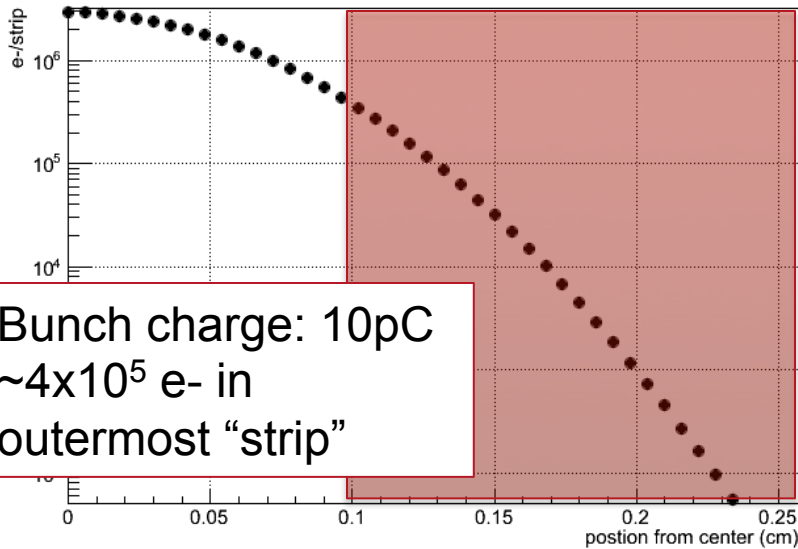


“active region”: keep $\ll 10^5 e^-$

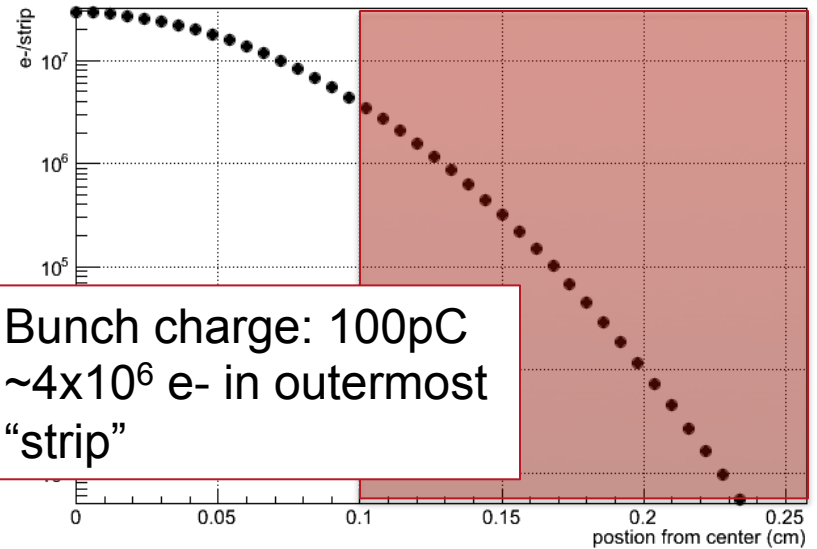
“Strip intensity”

Intensities/60um “strip” for 10pC and 100pC bunch charge

Air: $\sigma_{BS} = 500\mu\text{m}, d = 10.0\text{cm}, t = 1.417e-04X_0$



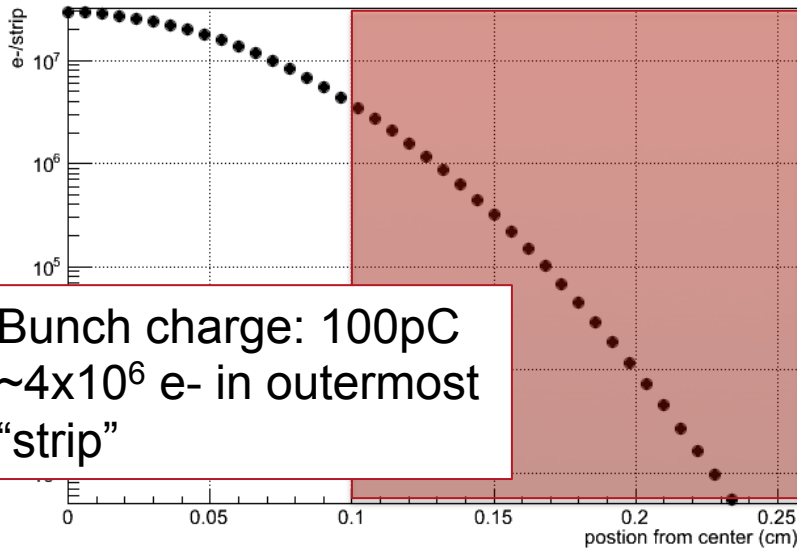
Air: $\sigma_{BS} = 500\mu\text{m}, d = 10.0\text{cm}, t = 1.417e-04X_0$



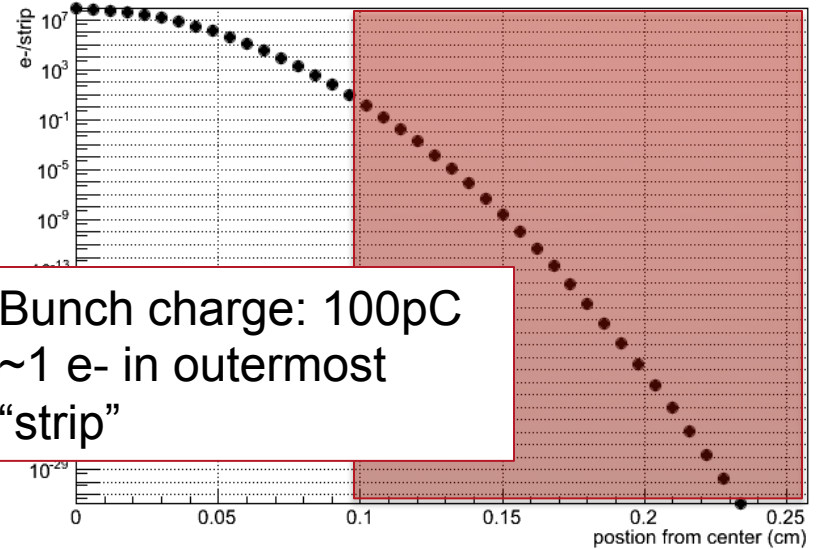
“Strip intensity”

Intensities/60um “strip” for 500um and 150um spot width

Air: $\sigma_{BS} = 500\mu\text{m}, d = 10.0\text{cm}, t = 1.417e-04X_0$



Air: $\sigma_{BS} = 150\mu\text{m}, d = 10.0\text{cm}, t = 1.417e-04X_0$



Need spot size <300-400um to be safe

Ideas for setup

Beam position from YAG screen with fiducial markings

- Beam position mean to within <math><50\mu\text{m}</math>?
- Sensor mounted on same platform
- Survey position between YAG screen and sensor to within 50 μm ?



Silicon sensor

Survey Si edge to YAG screen fiducial marks

YAG screen for beam position

XYZ stage (<math><10\mu\text{m}/\text{step}</math>)

Move sensor edge into beam by controlling the beam spot on the YAG

Should also work in ESTA(?)

