The new Gun Section for FLASH

FLASH Seminar March 06, 2007 Klaus Floettmann

Not all drawings are up-to-date; ignore discrepancies!

The gun section at FLASH



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Components in the gun section



With the new section we want to:

- improve the alignment
- improve the accessibility
- improve the vacuum
- improve the mechanical stiffness by a stronger support and a better connection of the actuators to vacuum system
- allow for a better mounting and shielding of cameras
- reorder the cableing
- increase the gap height of dipole chamber
- improve the dark current collimation
- fix a number of smaller issues

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Present Status



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Design of the new section



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Comparison





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Top view with laser table



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The Laser Table



to beam line



Camera diagnostics in the Gun area:

- Virtual Cathode
- PCO camera for parasitic laser check
- 2 GUN
- 3 GUN
- IDUMP
- Cathode check

Front view with camera table



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New Diagnostics Cross: Side View



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New Diagnostics Cross: Cross Section



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Equipped Diagnostics Cross



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New corrector magnets



Modified spectrometer:

- increased gap height (35 mm)
- new pole shoe contour
- focusing optimized to work in combination with the slit
- long edge fields, electrons travel far on the inside of the vacuum chamber, not really nice!



Dark current: Present situation



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Dark current: Proposal by Jang Hui

0.3 m elongation between the gun and ACC1



Distance from the cathode to the collimator $1.27 \text{ m} \rightarrow 1.57 \text{ m}$ Distance center of kicker to collimator: ~ 80 cm

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Simulation results

Dark current simulation result at 6 m (20 000 macro-particles) Dark current starts from the cathode area (2 mm rms)

Parameters	Present setup	Proposed setup	Difference
Collimator position	1.27 m	1.57 m	
Without collimator	3385	2604	20%↓
With 8 mm ϕ collimator	1808	801	55%↓

Adjustable Collimator



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Top view of the injector area



Actors:

Antonio Wagner, Nils Mildner, Karsten Klose, Benjamin Polzin, Rolf Zahn, Dirk Lipka, Michaela Marx, Frank Obier and many more.

Thanks to all of them.

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