

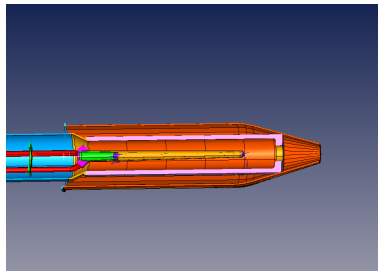
Start Counter Status

Benedikt Zihlmann

Start Counter

Detector Overview:

- Cylinder with 30 scintillator paddles $R=8.75\text{cm}$, $l_r=2.0\text{cm}$
- Paddle cross section: $3\text{mm} \times 16.9$
- Readout: five $3\text{mm} \times 3\text{mm}$ SiPMs in a row
- Support structure: rohacell, carbon-fiber
- Signals: Preamp board, RG58 cables
- Digitizers: f250 and F1TDC
- Power: LV: 5V, Bias: 72V



Start Counter running to 2030

Components of SC:

- Scintillators: close to beam line (10cm) no radiation damage expected
- SiPMs: Silicon based photo sensors, are susceptible to neutron radiation damage

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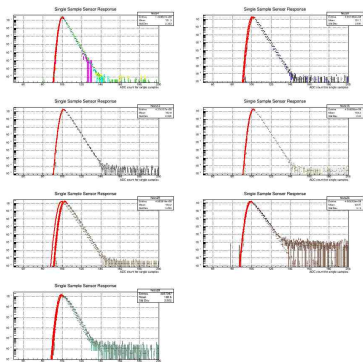
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- Increase of dark current is observed since the start of its measurement.

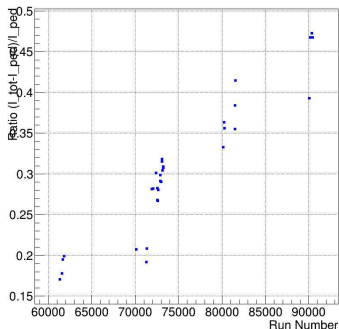
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SC SiPMT degradation



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- <https://logbooks.jlab.org/entry/3984483> (M. Dalton)
60k Period: 150 mrem: $\Delta SC_{dark_current}$: 0.05?
70k Period: 1015 mrem: $\Delta SC_{dark_current}$: 0.13
80k-90k Period: 361 mrem: $\Delta SC_{dark_current}$: 0.14

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- Impact on timing resolution (design req. 350ps):
First measurements 270ps (run # 10k)
Increase to 310ps (run # 30k, 40k)
Increase to 320ps (run # 70k)
Increase to 330ps (run # 90k)

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- Need to continue monitoring development closely.

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Course of action:

- Monitor development
- Prepare to build replacement boards with SiPMTs (10 boards with 15 SiPMTs each)
- Develop work plan for replacement.
- When required, replace all boards with these new ones.
- Alternatively: FIU has a full set of scintillators to build a new SC. (much larger effort)