

Measurements Cyrce - New Arrays 23.09.2

- Start by adjusting position of array $[20^x / 20^y]$ as middle of round aperture
- test-snapshot ok [2V set for beginning]
- This time: Bigger diffuser 400 μm (last time 40 μm) \rightarrow beam should be flat
- 1st voltage scan:
 - \rightarrow lots of "0's" at 2V {"02-flat-calib"}
- 1st: 1-2V, 0.1V step
- 2nd voltage scan: ~~0.0~~ 0.0 - 2V / 0.1V steps {"voltage-scan-no-beam"}
- \Rightarrow 2V seems a bit high (too many 0 values), 1.9V better!
 - \rightarrow call with JYD
- 3rd voltage scan 2nA: 0.0 - 2.0 V / 0.1V steps
 - {"voltage-scan-beam-2nA"}
 - \rightarrow middle of array should be irradiated, but we don't see difference
- [We reduce the thickness of the diffuser to 200 μm , otherwise too much radioactive activation in room]
- \Rightarrow We observe strange pattern signal - no signal in AMS-view
 - \rightarrow probably channel assignment strange (1 channel signal, 1 channel resp)
- \Rightarrow we choose 1.8V as set voltage (2V too high, 1.7 and 1.9V also too high)
- Position scan: X = 0 ... 40 mm / 0.5 mm step
 - {"scan-round-aperture-200um-2nA"}
 - \rightarrow Looks good: we at first observe smaller border regions ($\hat{=}$ middle of Canted array?!, then more and more signal)
- The results of the voltage scan for 1.8V can be taken as dark calib file, we may take some dark calibs over the day

- y-scan for calibration (first 2 manual shots)

[Stéphane resettled meters: $y = 40$ as upper part of scan in ab

$\{1.8 - 20 - 40 - 2nA\}$

uniformity

- scan in y-direction $\{ \text{uniformity} - \text{scan} - 200\mu m - 2nA \}$

\hookrightarrow we do not see the beam after $y = 20$, we reset to see if x was wrong

\Rightarrow From the y-scan we understand the assignment of the diodes:

Channel 1::2 until 64 $\hat{=}$ Array diode 1...32

Channel 2::2 until 64 $\hat{=}$ " " 33...64

Channel 65::2 [::-1] until 128 $\hat{=}$ " " 65...96

Channel 66::2 [::-1] until 128 $\hat{=}$ " " 97...128

- We will do 3 phases of each image: $y = 40 \dots 70 \dots 100$ (so that the signal is centered in the upper array, middle array, lower array)

$\hookrightarrow x = 0 \dots 40$ in 0.5 steps

[During the experiment the beam intensity decreased down to 1.2 nA] \rightarrow we will manually change in between steps to allow the beam to be adjusted in between

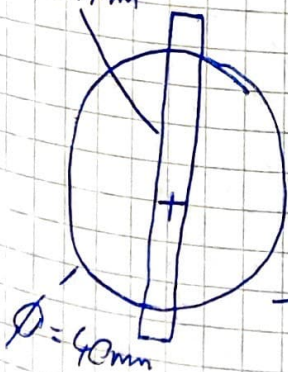
• Scan round aperture $y = 40$ [Beam decrease: 2.43 nA \rightarrow 2.34 nA]

• Scan round aperture $y = 70$ [Beam decrease: 2.43 nA \rightarrow 2.36 nA]

• Scan round aperture $y = 85$ [Beam decrease: 2.41 nA \rightarrow 2.36 nA]

[We took a scan with 40, but only half of aperture is pictured...]

$\phi = 64 \text{ mm}$



- upper image: $y = 55$

- middle: $y = 70$

- lower image: $y = 85$

Conversion:

2.43 at Faraday cup

$= 1.99 \text{ nA at array}$

[without diffuser we have 25 nA for the 200 μm diffuser]

• Scan round aperture $y = 55$ [Beam decrease $\frac{2.435}{2.95} \text{ nA} \rightarrow 2.38 \text{ nA}$]

[without diffuser current is 1:1 on array]

- without diffuser - full beam $\gamma = 55$ (Beam: $2 \text{ nA} \rightarrow 1,91 \text{ nA}$)
- " $\gamma = 70$ (Beam: $2 \text{ nA} \rightarrow 1,95 \text{ nA}$)
- " $\gamma = 85$ (Beam: $2 \text{ nA} \rightarrow 1,97 \text{ nA}$)
- We change the panel aperture for the IPHC - Logo part
↳ scan with diffusers $200 \mu\text{m}$ (now conversion factor is on again)
- measurements at $\gamma = 55 \dots 85$ in 10 mm steps - this time 1 measurement over Cench ~ Beam seems to be reasonably stable for this
(Beam: $2,44 \text{ nA} \rightarrow 2,33 \text{ nA}$) { Logo - }

[after Cench brake ~ 1:30h with beam on, quite high amount of activation ~ Logo shape actually "burned" ~ changed color to brown on backside]

- misc - shape with $200 \mu\text{m}$ diffuser { Beam $2,43 \text{ nA} \rightarrow 2,43 \text{ nA}$ }
↳ $55/70/85$ { Misc Shape - }
- Bragg shape (1st change scan: $0 - 40 \text{ mm}$, 70 at γ)
↳ (Beam: $2,43 \text{ nA} \rightarrow 2,41 \text{ nA}$) { Bragg Peak - }
- Bragg shape γ -scan $\rightarrow x$ centered at 20 , γ -shifted from $40 \rightarrow 100$ in 0.5 steps
(Beam: $2,44 \text{ nA} \rightarrow 2,44 \text{ nA}$) { Bragg γ Scan - }
- Norm Scan \rightarrow same geometry, panel aperture (Beam: $2,44 \text{ nA} \rightarrow 2,43 \text{ nA}$)
{ Normalization 2 - }

\Rightarrow We change the array (16:30h), now $0,35 \times 0,5 \text{ mm}$ diodes
{ "Array 3" }

- Voltage Scan $0 - 2 \text{ V} / 0,1 \text{ V}$ steps: { Array 3 - Voltage Scan - }

[Comment Observation: For array 3 1 diode is not working at set voltage, but seems to work at another voltage?
↳ check this from the voltage scan, maybe Rint]

- Voltage Scan Beam (Beam: $2,44 \text{ nA} \rightarrow 2,45 \text{ nA}$)

- y-scan diffused beam (beam: 2,45 nA \rightarrow
 - \rightarrow from 50 to 90 nm / 0,25 nm steps [x is 20, but 0 in name]
- [Something's odd at the first attempt \rightarrow signal lower than previously seen in voltage scan]
 - \rightarrow voltage seem to keep one value if changed, we set the best seen signal amplitude and leave V unchanged \sim not working
 - \rightarrow no change between tests after seeing amplitude of 100 pA (200 pA = dark / 300 pA = signal) but when we start measurement we observe 40 pA = dark, 80 pA = signal
- \Rightarrow after some tests it seems to work now with the higher signal amplitude at 1,8 V \sim we finally perform the y-normalization scan
- Beam without diffuser scan { Array3-BeamShape- } (beam: 2,0 nA \rightarrow 1,9 nA)
 - [We discover problem during change to Cogo: In Stéphanes program a manually set voltage is set as an int, which lead us to think
- * that something was wrong when we set the voltage through the program to 1,8 V
 - scan of Cogo { Array3-Cogo- } (beam: 2,45 nA \rightarrow 2,42 nA)
 - \rightarrow the measurement at V = 1,8 V
- End of measurement day

*: Everything (except for voltage scan) measured for Array3 until this point was set to ~~1,8 V~~ 1,0 V instead of 1,8 V. The set voltage choice of 1,8 V was not accurate, because we manually tuned through the voltage. There might be a better voltage, which can be seen in the voltage scan, where V was set accurate. For the 1st array V was ~~at~~ set to 1,8 V!