Average Beam currents and charges

Av. Current_u1(uA)	Charge(uC)
5.01 ± 0.0079	$3.05x10^2$
10 ± 0.00033	$4.34x10^2$
14.672 ± 0.0018	$2.96x10^2$
19.92 ± 0.00184	$6.14x10^2$

Av. Current_d1(uA)	Charge(uC)
5 ± 0.00798	$3.043x10^2$
10.002 ± 0.00362	$3.03x10^2$
14.67 ± 0.0018	$2.96x10^2$
19.93 ± 0.00183	$6.14x10^2$

Av. Current_d3(uA)	Charge(uC)
5.06 ± 0.0093	$3.08x10^2$
9.914 ± 0.0037	$2.99x10^2$
14.6 ± 0.0017	$2.94x10^2$
19.995 ± 0.0019	$6.158x10^2$

Av. Current_d10(uA)	Charge(uC)
5 ± 0.01	$3.1x10^2$
9.93 ± 0.0032	$3x10^2$
14.62 ± 0.002	$2.947x10^2$
19.98 ± 3.856	$6.152x10^2$

calculation of average charge and current

$$Q_{av} = \int I \, dt$$

$$= \int_0^t (a \times Scalar\_r + b) \, dt$$

$$= a \int_0^t Scalar\_r \cdot dt + b \int_0^t dt$$

$$= a \times [Scalar\_C(t) - Scalar\_C(0)]$$

$$+ b \times \frac{[clk\_count(t) - Clk\_count(0)]}{103.7 \times 10^3} \longrightarrow (1)$$

Where, $a \rightarrow$ gain, $b \rightarrow$ offeset

$Scalar\_r \rightarrow$ BCM Scalar rate

$Scalar\_C \rightarrow$ BCM Scalar Count

$clk\_Count \rightarrow$ Clock Count

Also, BCM Current

$$I_{BCM} = a^x [Scalar\_r(t) - Scalar\_r(0)] \longrightarrow (2)$$

Uncertainity in BCM Current:

We have

$$I_{BCM} = a^* (f - f_0) \longrightarrow (1)$$

So, Uncertainity in I_{BCM} is,

$$\Delta I_{BCM} = \sqrt{\Delta I_a^2 + \Delta I_f^2 + \Delta I_{f_0}^2} \longrightarrow (2)$$

Where, $\Delta I_a = \frac{\partial I_{BCM}}{\partial a} \times \Delta a$

$$= (f - f_0) \times \Delta a \longrightarrow (3)$$

$$\Delta I_f = \frac{\partial I_{BCM}}{\partial f} \times \Delta f \longrightarrow (4)$$

$$= a \times \Delta f \longrightarrow (5)$$

$$\Delta I_{f_0} = \frac{\partial I_{BCM}}{\partial f_0} \times \Delta f_0$$

$$= -a \times \Delta f_0 \longrightarrow (6)$$