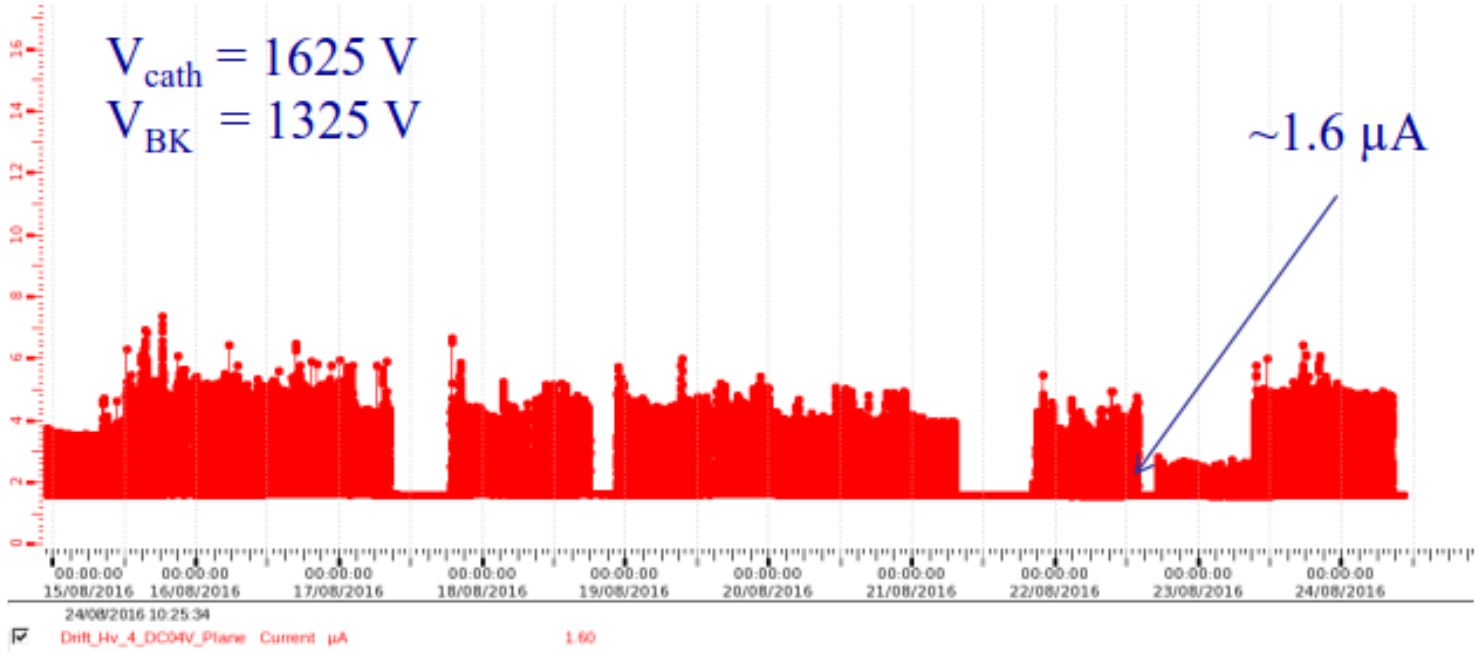
2016 – residual current in V plane

TB 30.08 16
By Stephane P.

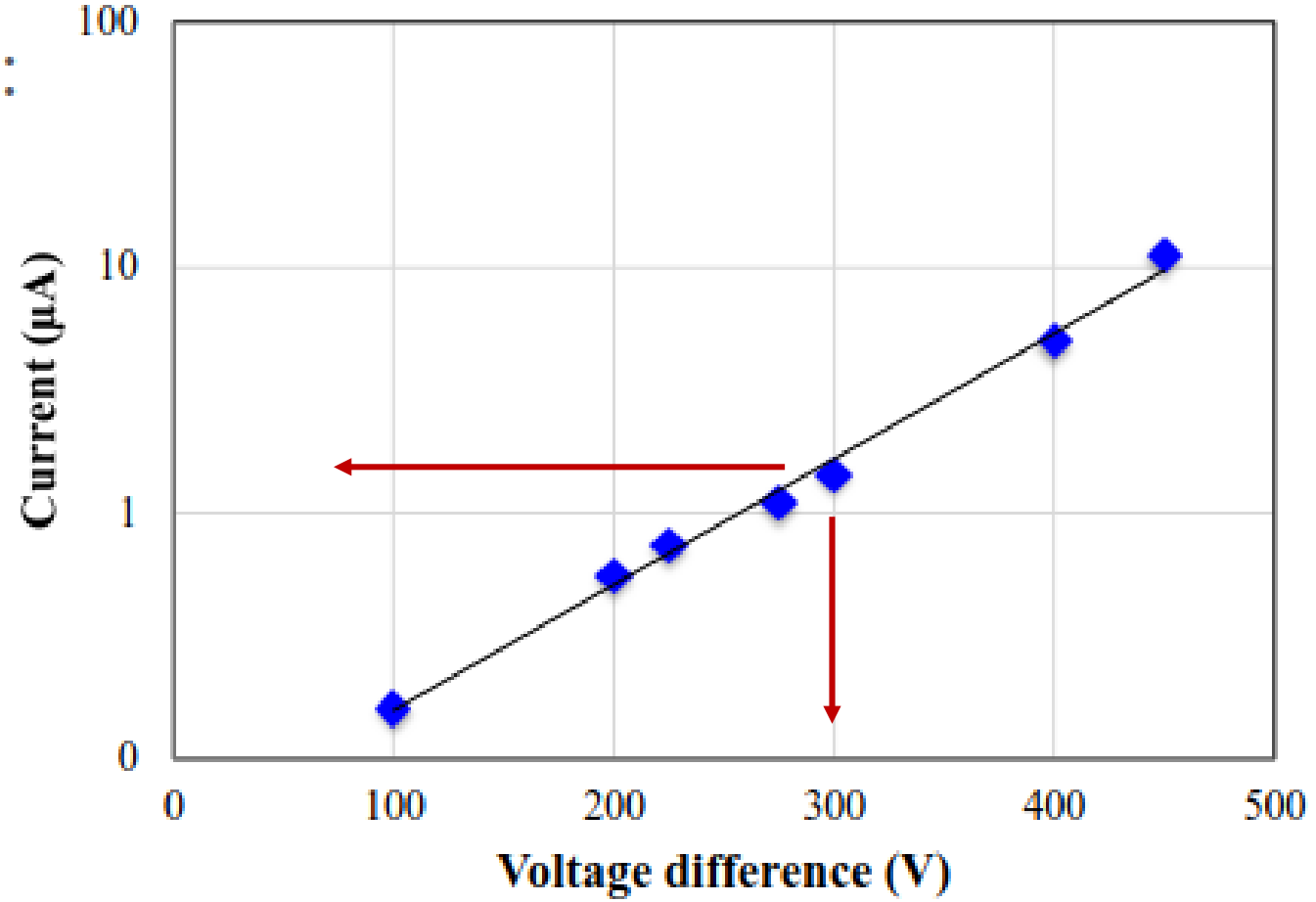
- Current appeared in April 2016, was not there in 2015
- Stable between end of April and end of August 2016
- Should be equal to 0



Not nominal conditions: the current depends on the voltage difference between the cathode and BK

Residual current vs Plane-BK voltage difference

- Normal operation for DC4:
  - V_{cath} = 1675 V
  - V_{BK} = 900 V
- Compromise in 2016:
  - V_{cath} = 1625 V
  - V_{BK} = 1325 V



DC4 repair

- Fix the problem : chamber must be opened
- Proposal : immediately after the 2016 run
  - During repair: exchange the 32 internal hotlink cables, as done for the external ones in 2016.

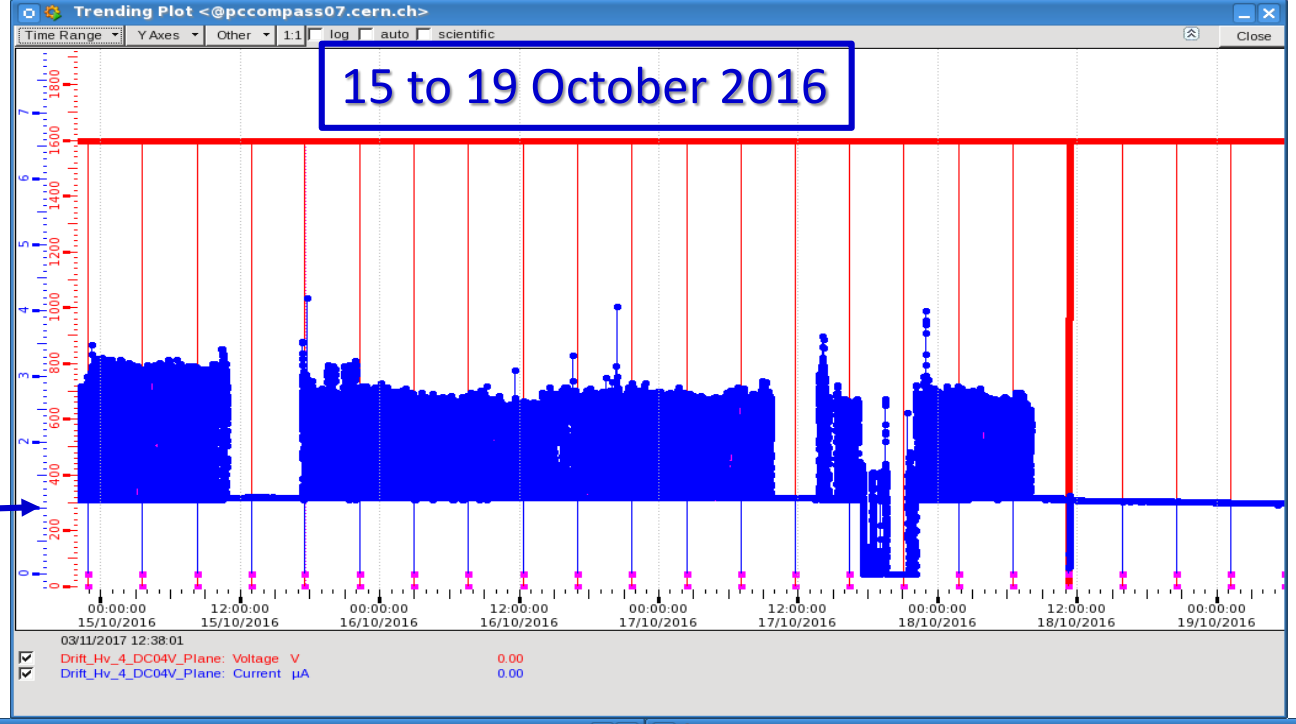
Unfortunately, NO manpower to perform the repair !

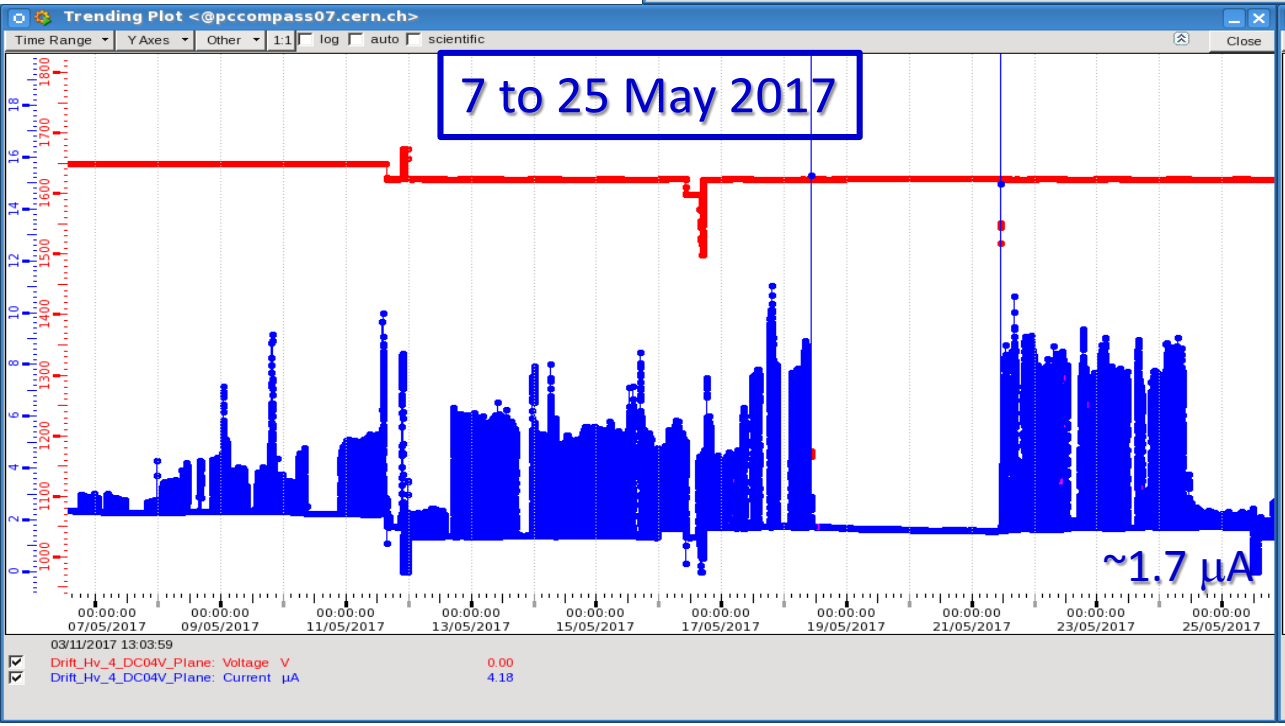
What is the status ?

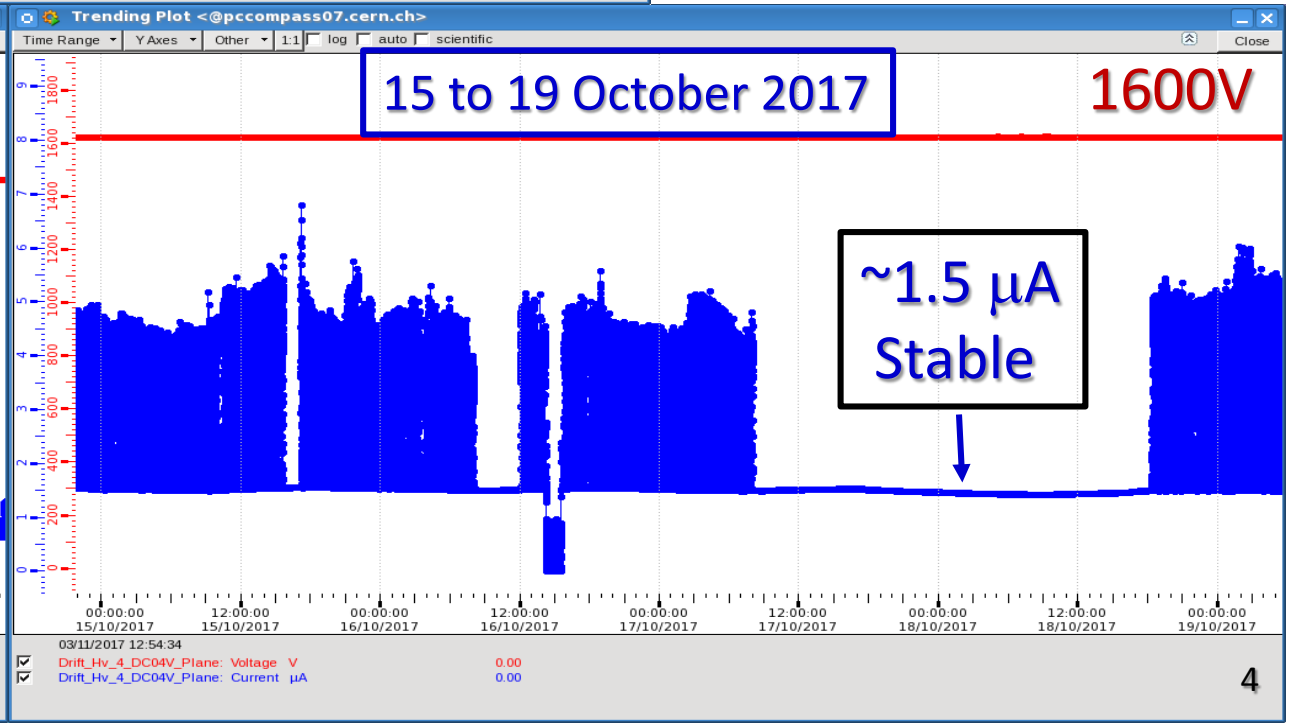
DC04V Plane V/I

Plots from DCS

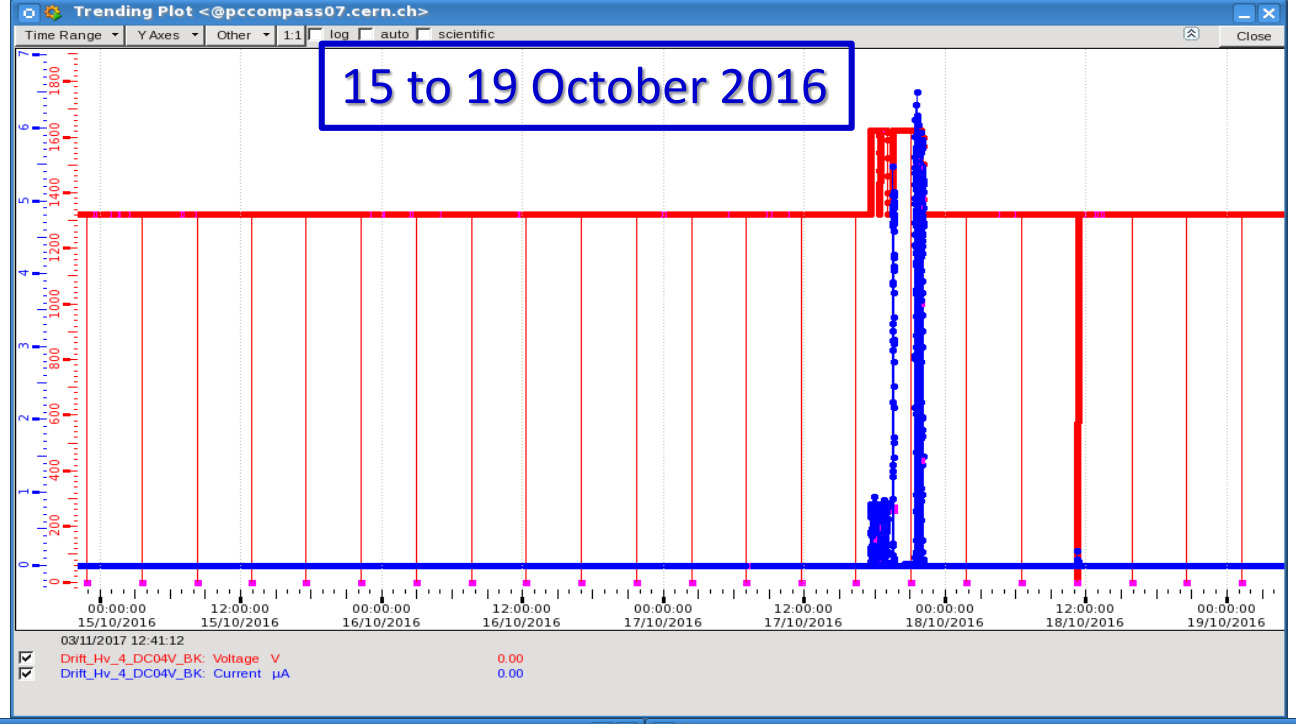
1 µA







DC04V BK V/I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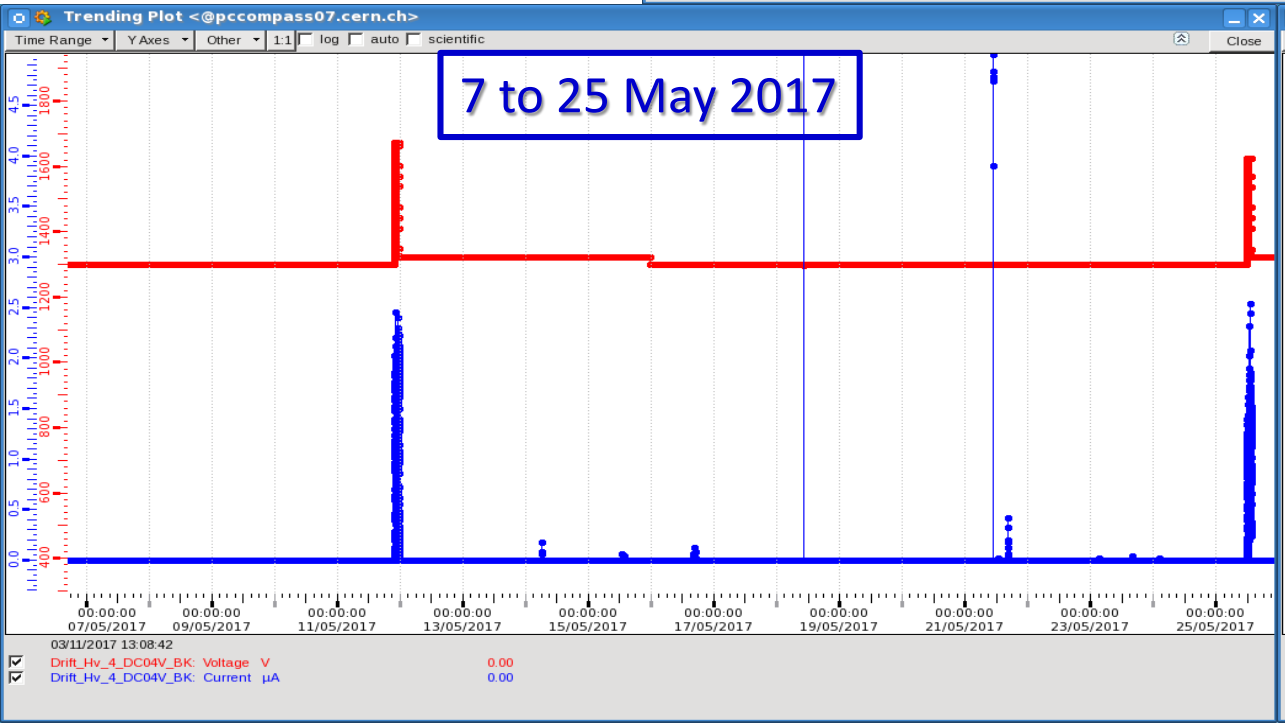
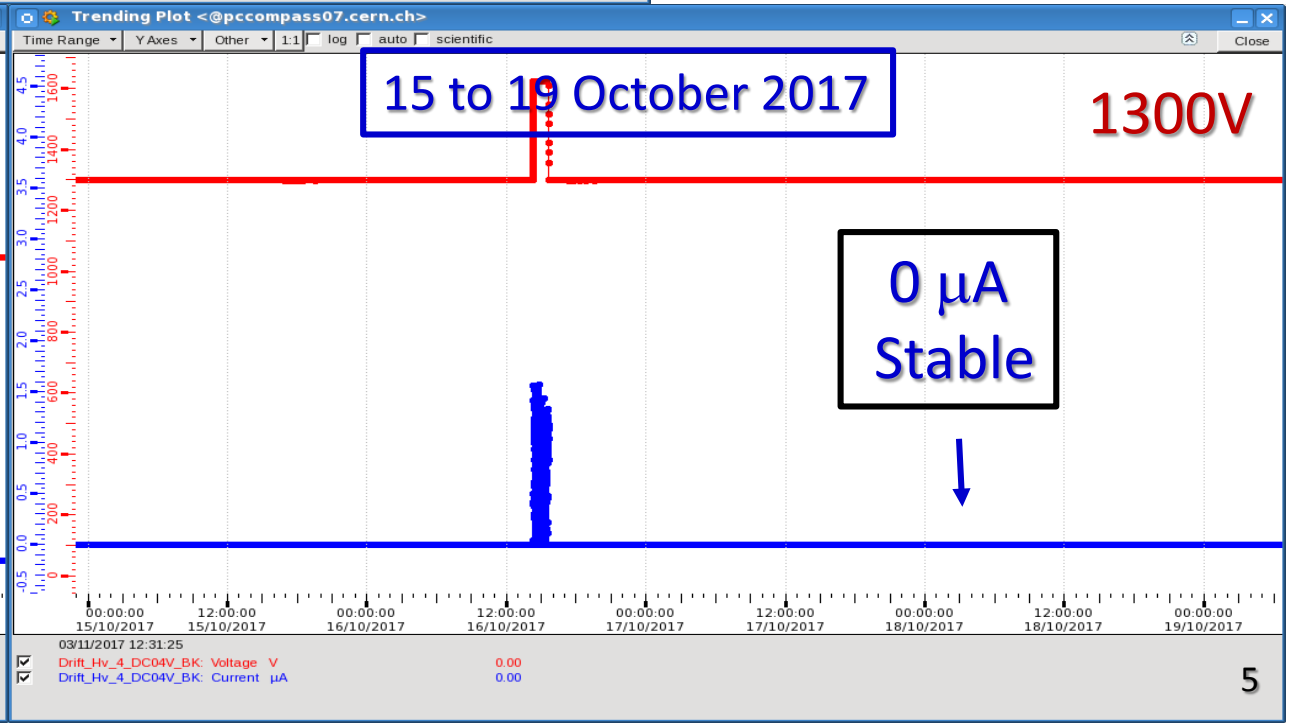
Time Range
Y Axes
Other
1:1
log
auto
scientific
Close
15 to 19 October 2016
00:00:00 15/10/2016
12:00:00 15/10/2016
00:00:00 16/10/2016
12:00:00 16/10/2016
00:00:00 17/10/2016
12:00:00 17/10/2016
00:00:00 18/10/2016
12:00:00 18/10/2016
00:00:00 19/10/2016
03/11/2017 12:41:12
Drift_Hv_4_DC04V_BK: Voltage V 0.00
Drift_Hv_4_DC04V_BK: Current µA 0.00


Trending Plot <@pccompass07.cern.ch>
Time Range
Y Axes
Other
1:1
log
auto
scientific
Close
7 to 25 May 2017
00:00:00 07/05/2017
00:00:00 09/05/2017
00:00:00 11/05/2017
00:00:00 13/05/2017
00:00:00 15/05/2017
00:00:00 17/05/2017
00:00:00 19/05/2017
00:00:00 21/05/2017
00:00:00 23/05/2017
00:00:00 25/05/2017
03/11/2017 13:08:42
Drift_Hv_4_DC04V_BK: Voltage V 0.00
Drift_Hv_4_DC04V_BK: Current µA 0.00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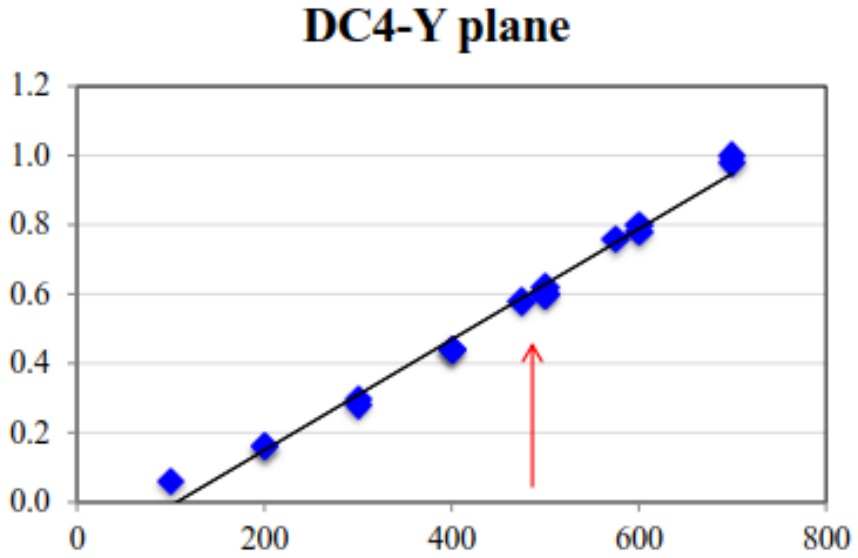
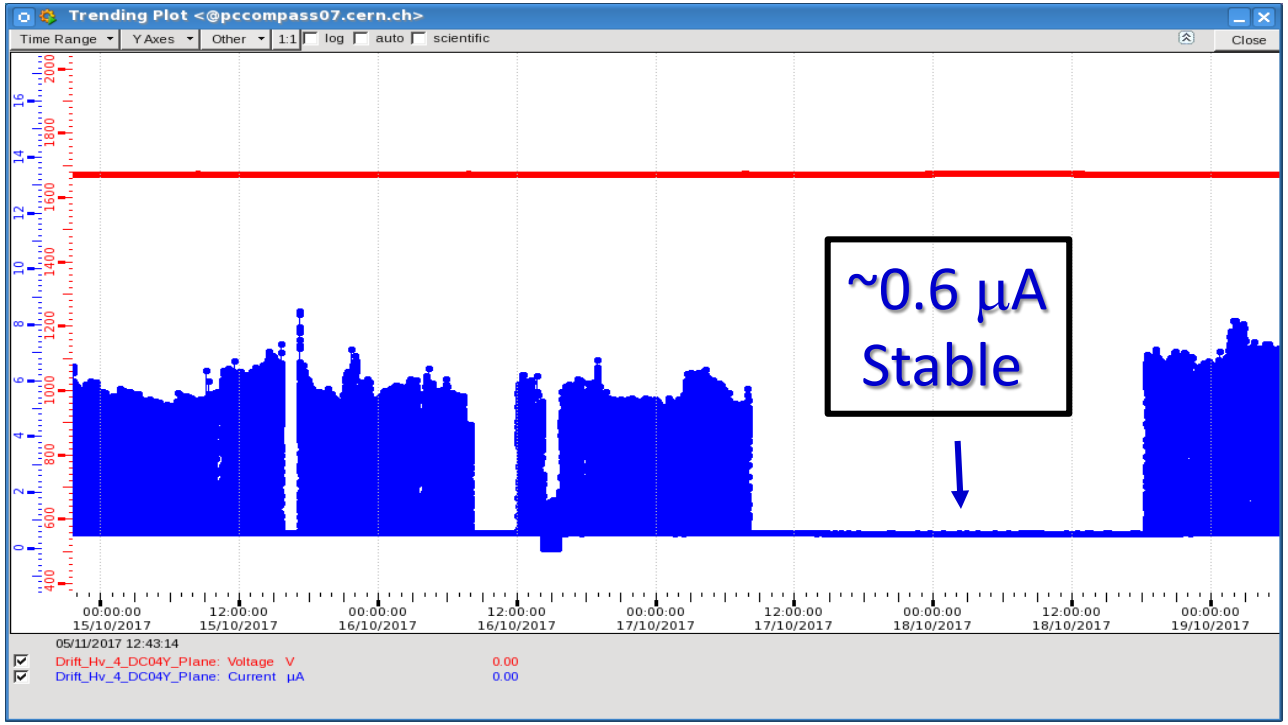
Time Range
Y Axes
Other
1:1
log
auto
scientific
Close
15 to 19 October 2017
1300V
0 µA
Stable
00:00:00 15/10/2017
12:00:00 15/10/2017
00:00:00 16/10/2017
12:00:00 16/10/2017
00:00:00 17/10/2017
12:00:00 17/10/2017
00:00:00 18/10/2017
12:00:00 18/10/2017
00:00:00 19/10/2017
03/11/2017 12:31:25
Drift_Hv_4_DC04V_BK: Voltage V 0.00
Drift_Hv_4_DC04V_BK: Current µA 0.00

Leakage current (much smaller) in Y plane

IRFU

DC04Y Plane V/I





Much lower current, in 2016 use V_{BK} = 1200 (I = 0.6 µA)
- with linear dependence

- Repair of DC04 should be planned following the 2018 Drell-Yan run

DVCS run 2017 Status of Saclay DCs (by Charles J. Naim)

- DC04 ⇦
- DC00 and DC01

Efficiency for DCs at the nominal tension

DC0 plans	HT	Efficiency
DC00X1 DC00X2	1700 V	93.8 % 87.5 %
DC00Y1 DC00Y2	1700 V	95.6 % 95.4 %
DC00U1 DC00U2	1700 V	90.5 % 89.6 %
DC00V1 DC00V2	1700 V	92.1 % 92.2 %

DC1 plans	HT	Efficiency
DC01X1 DC01X2	1700 V	93.4 % 94.4 %
DC01Y1 DC01Y2	1700 V	96.2 % 97.2 %
DC01U1 DC01U2	1700 V	91.0 % 86.0 %
DC01V1 DC01V2	1700 V	87.8 % 90.0 %

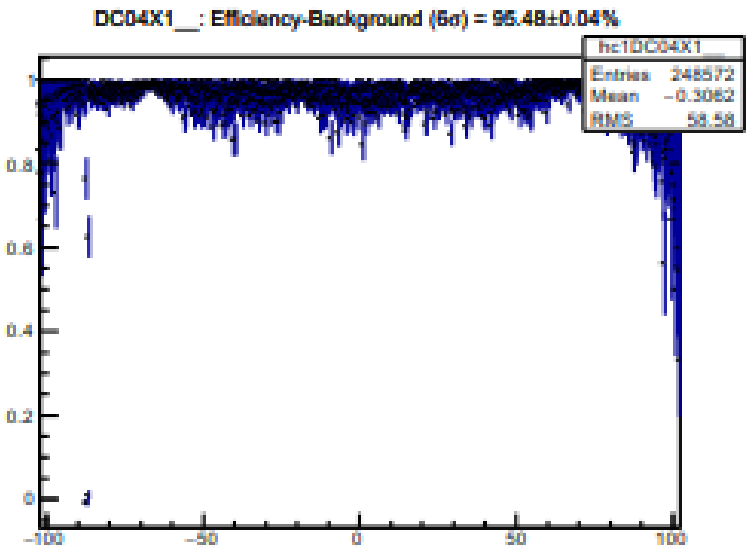
DC4 plans	HT	Efficiency
DC04X1 DC04X2	1700 V	95.4 % 94.4 %
DC04Y1 DC04Y2	1700 V	97.4 % 97.4 %
DC04U1 DC04U2	1700 V	93.4 % 94.0 %
DC04V1 DC04V2	1625 V	92.2 % 91.6%

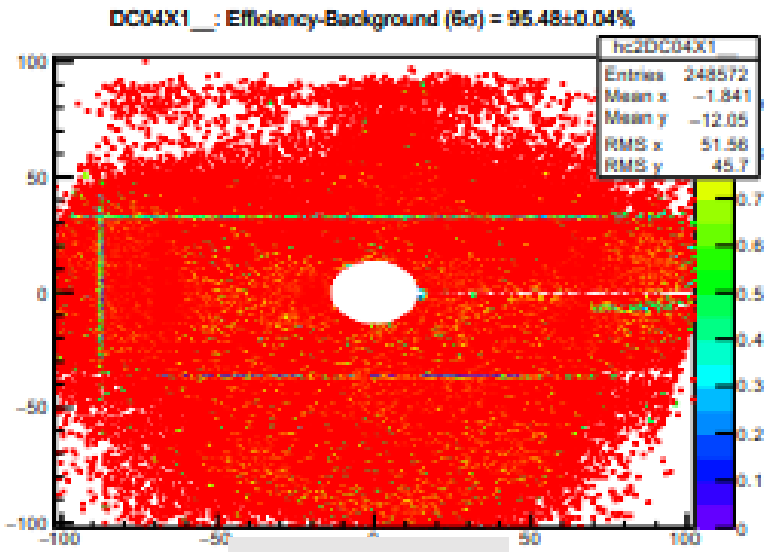
Efficiency >= 90 %

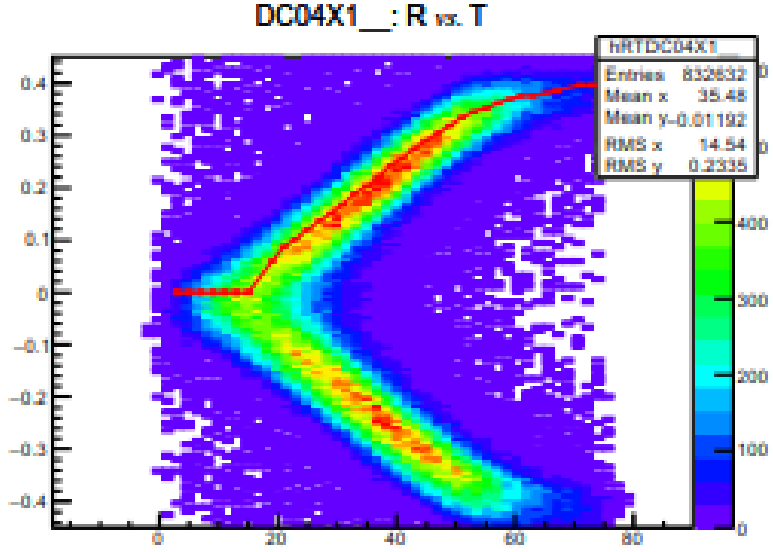
85 % < Efficiency < 90 %

DC04X1/X2

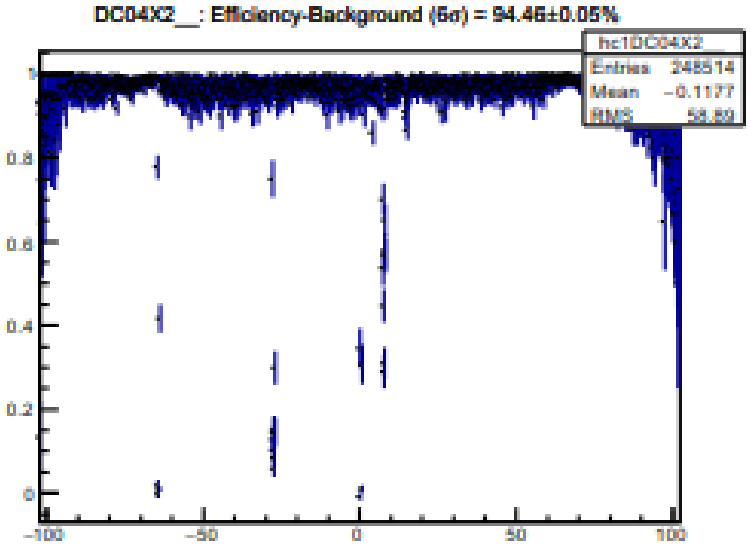
Eff = 95.5%

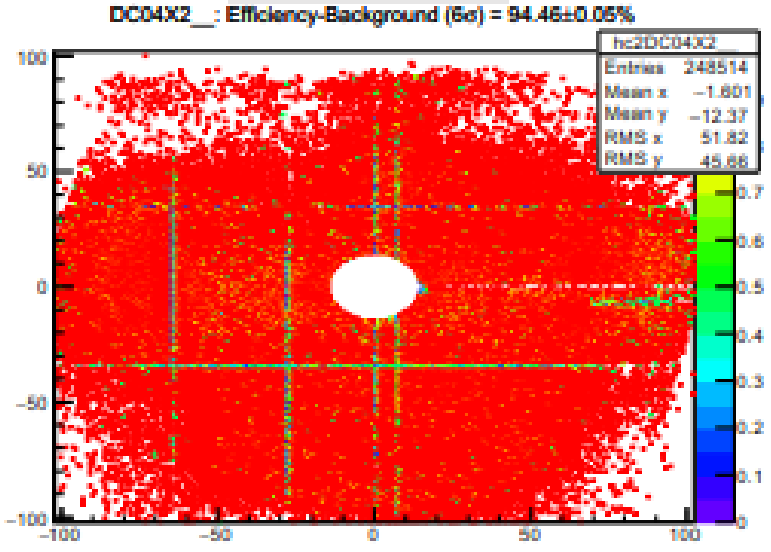


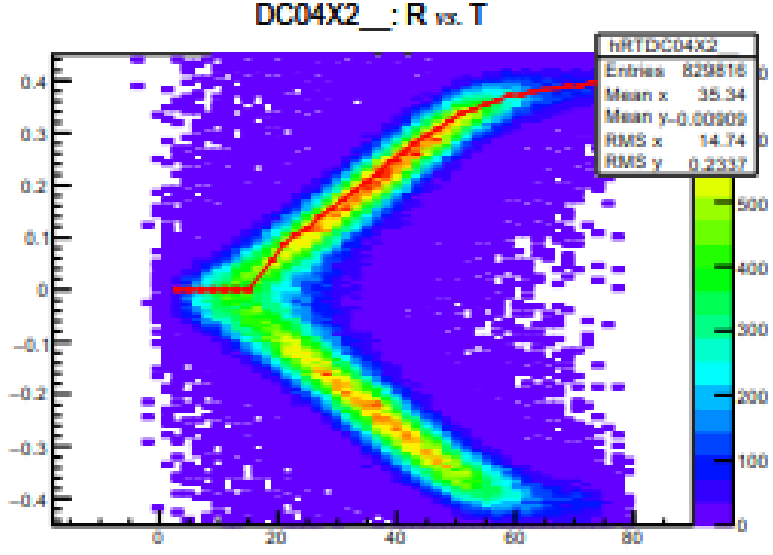




Eff = 94.5%

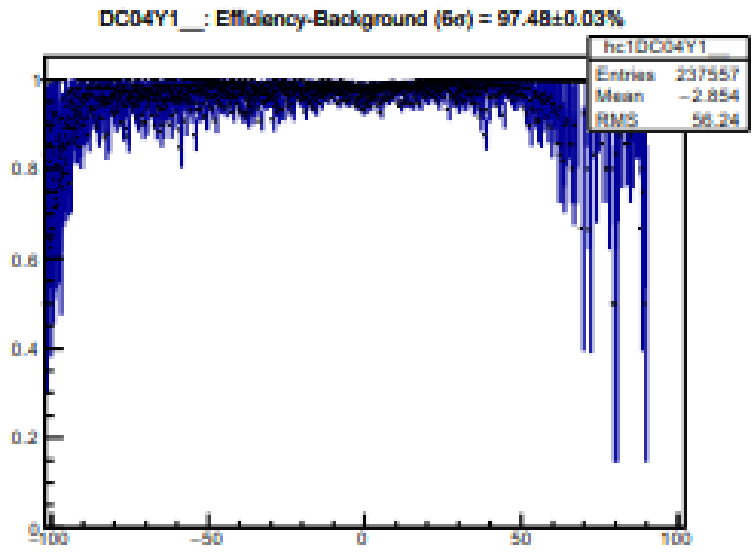


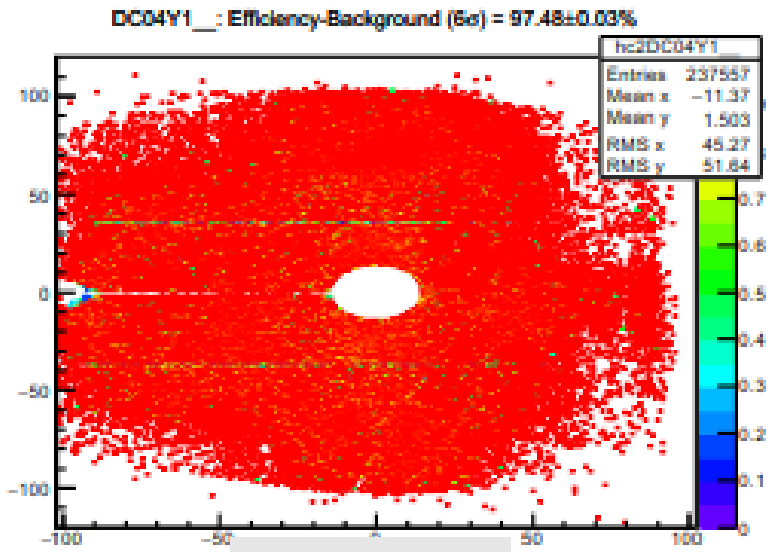


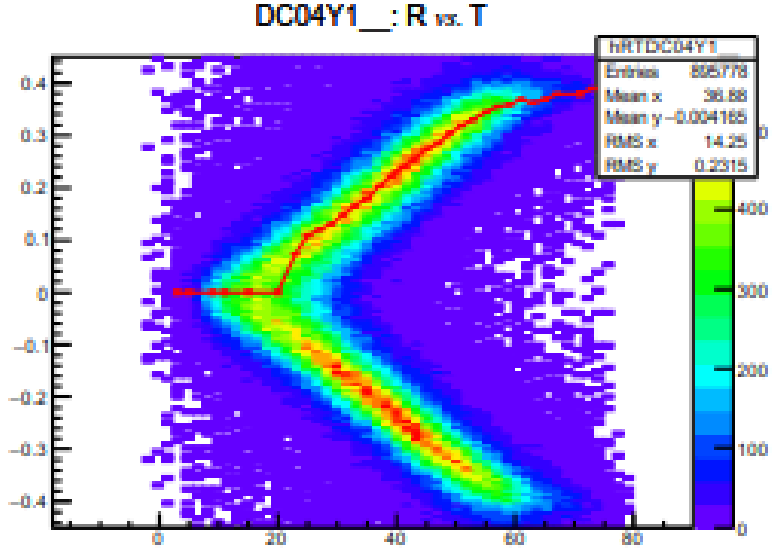


DC04Y1/Y2

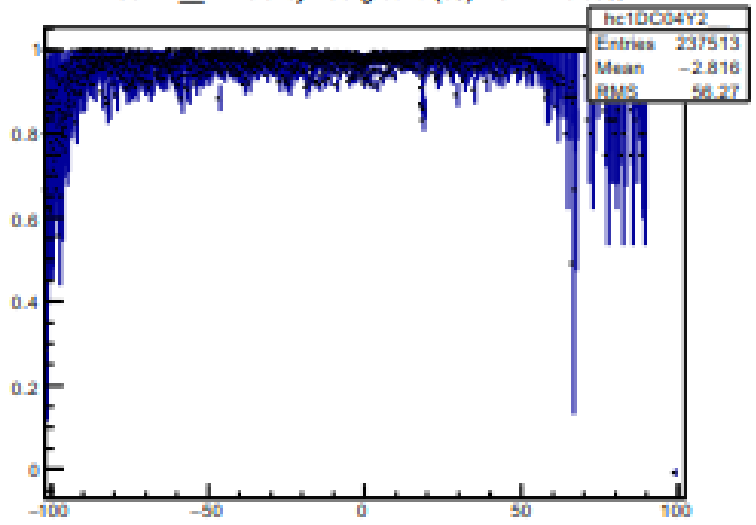
Eff = 97.5%

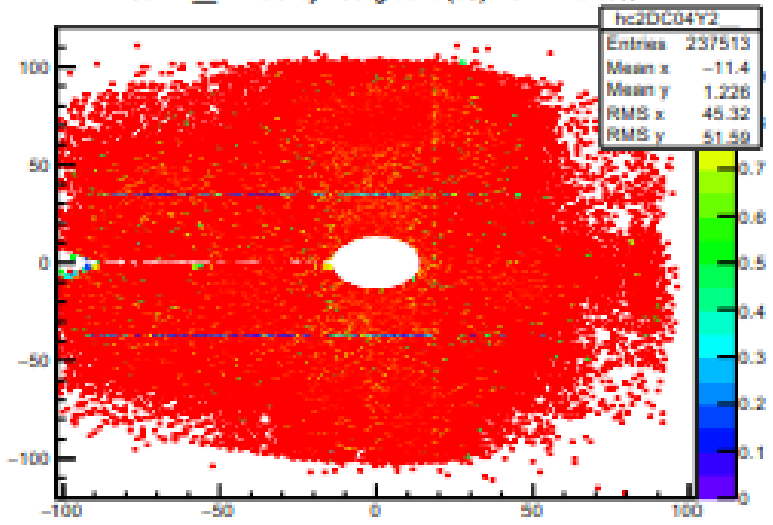


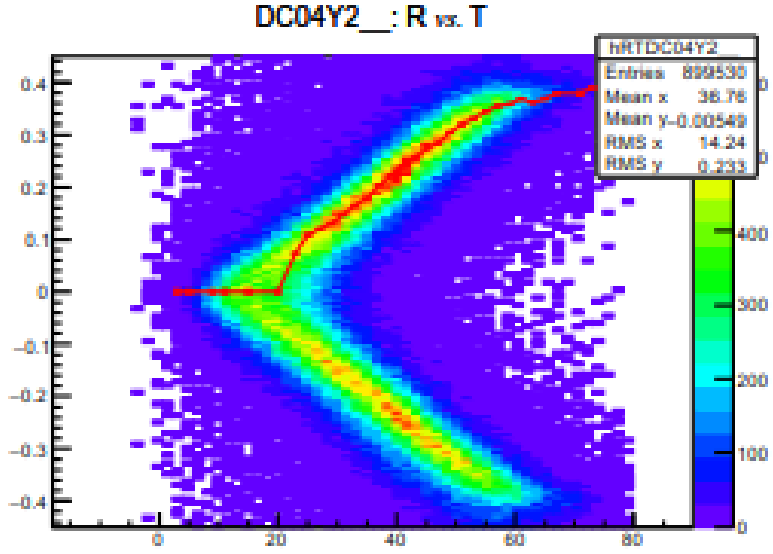




Eff = 97.4%

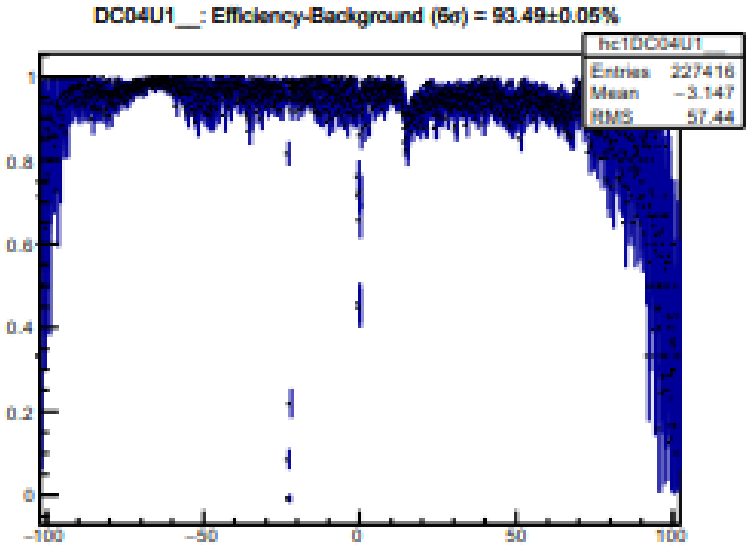


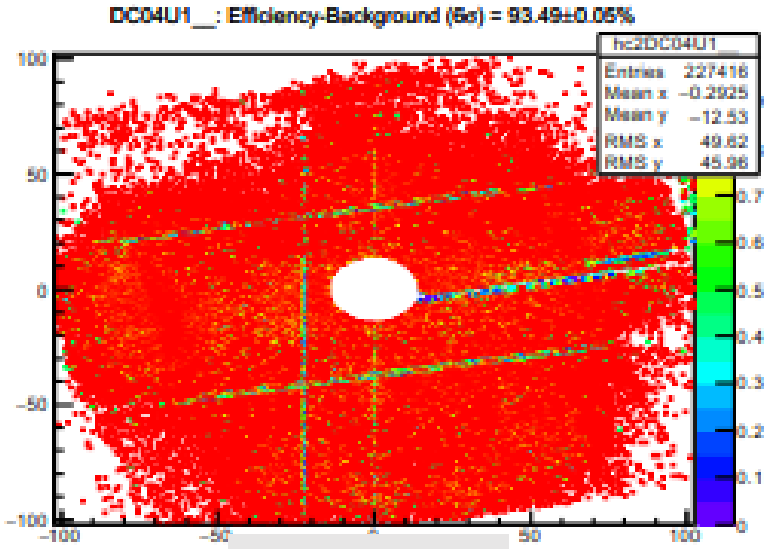


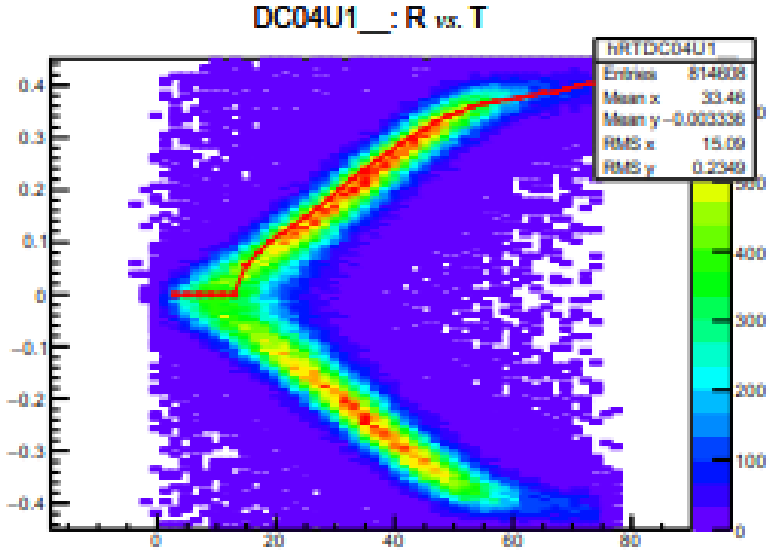


DC04U1/U2

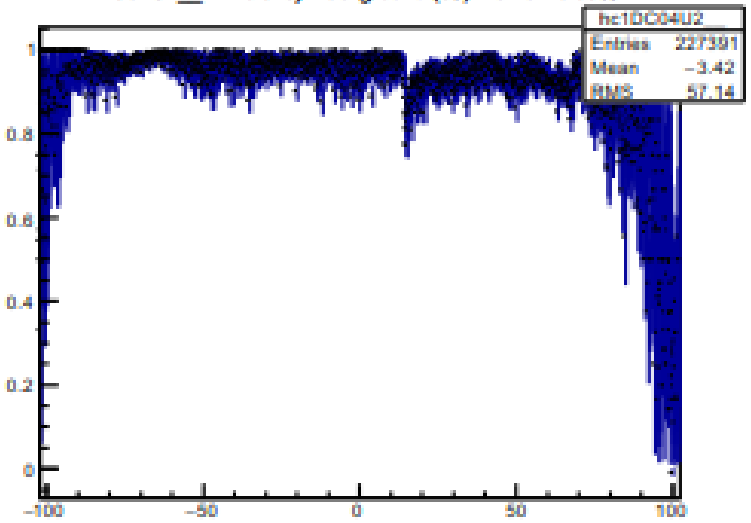
Eff = 93.5%

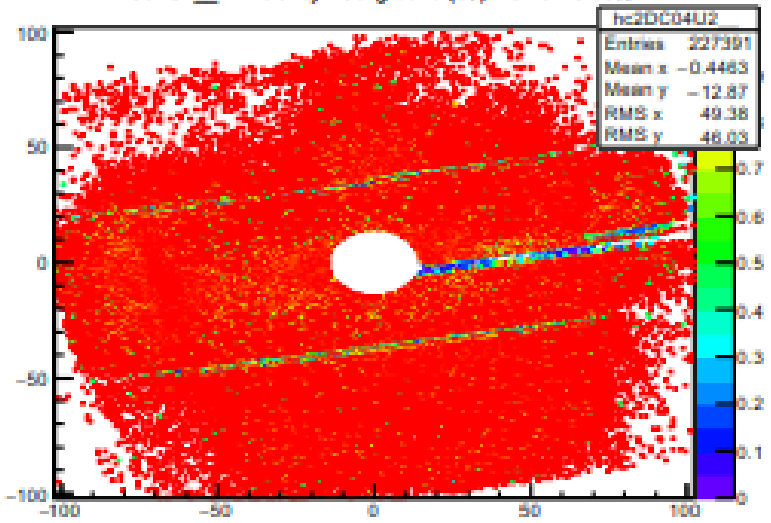


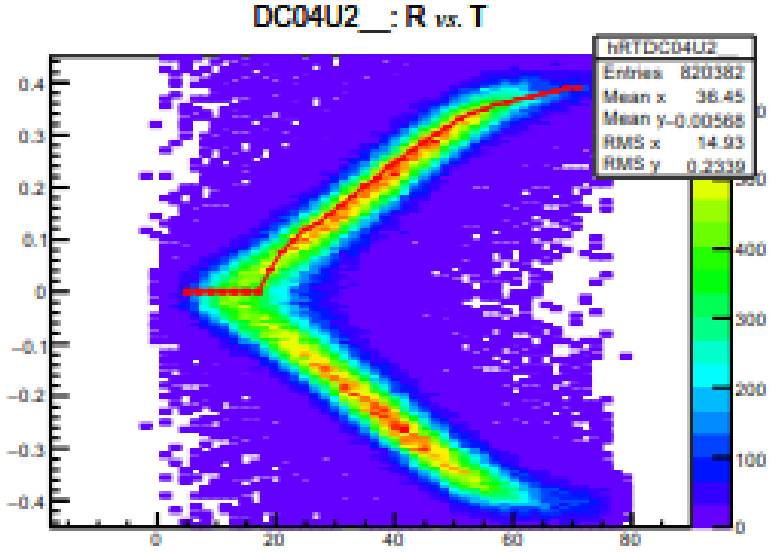




Eff = 94.0%

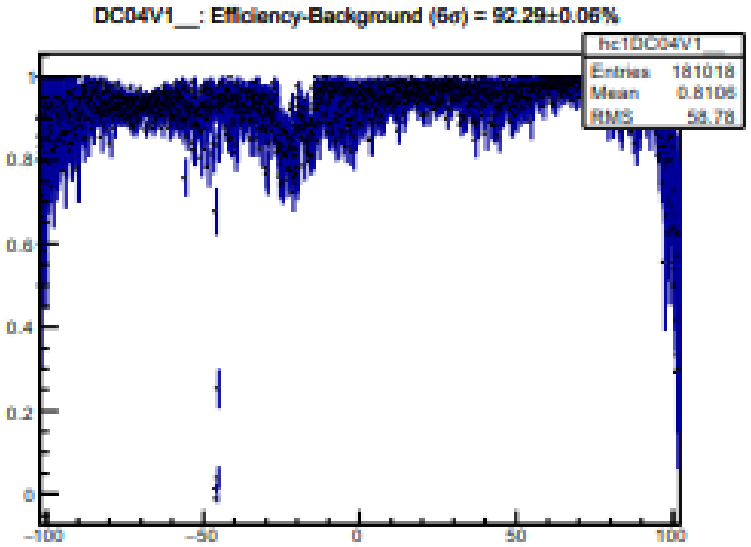


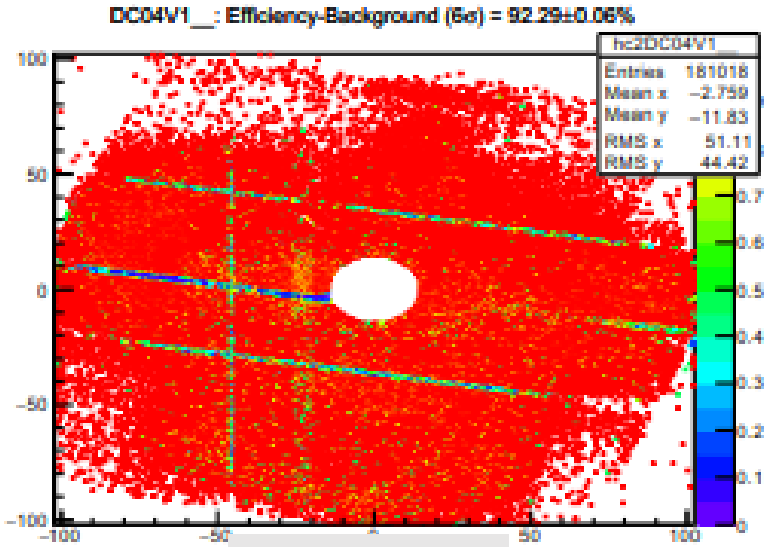


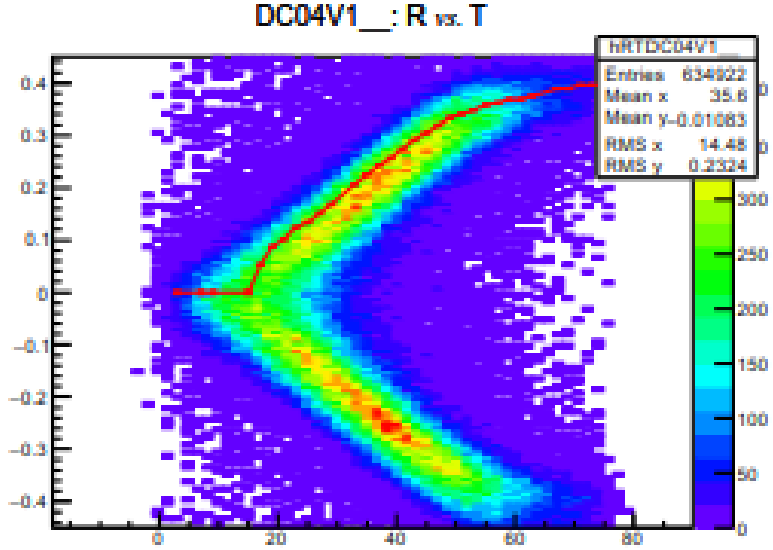


DC04V1/V2

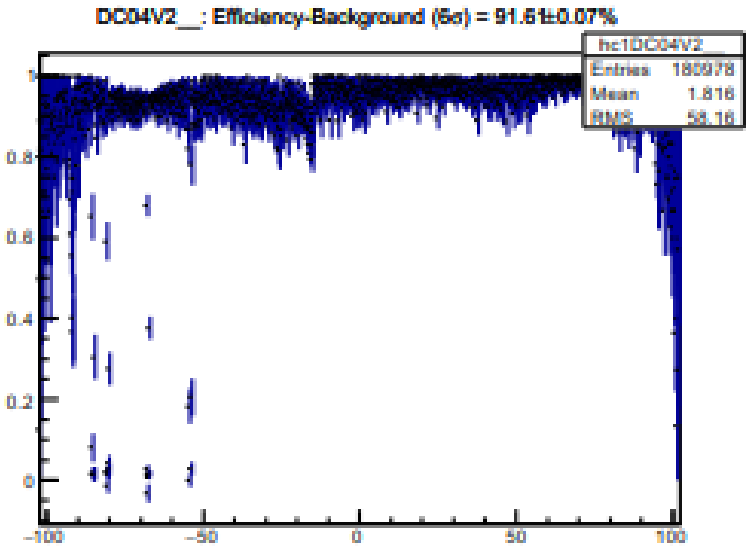
Eff = 92.3%

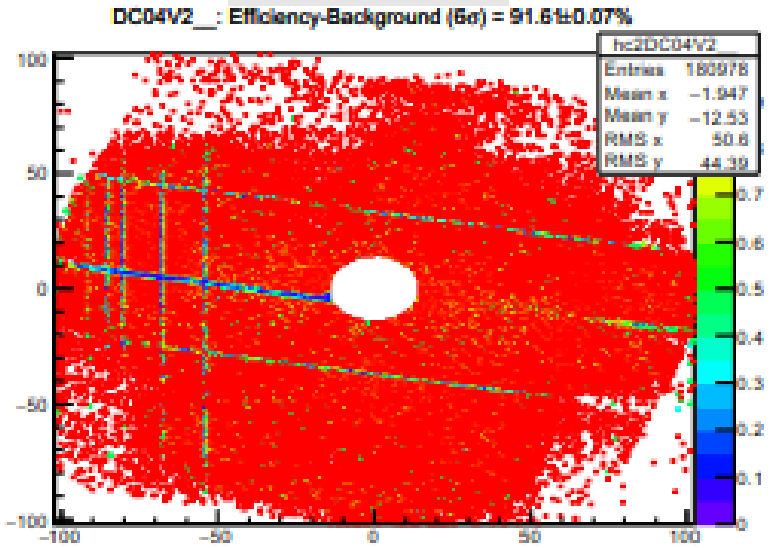


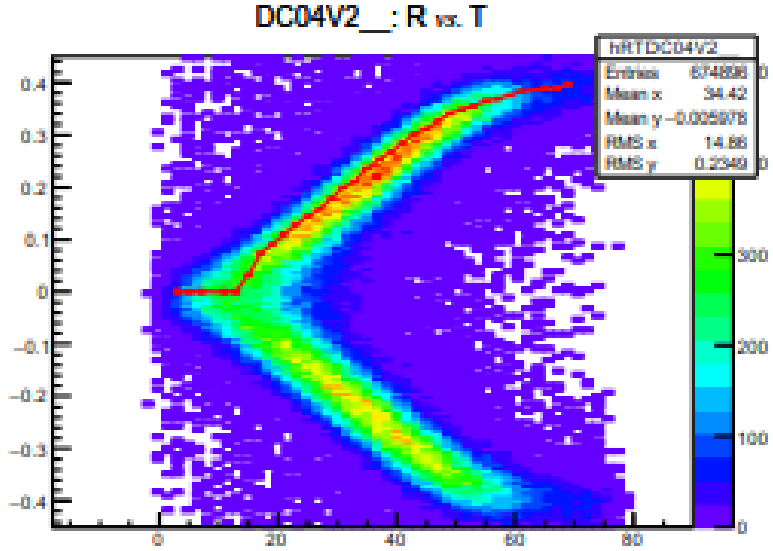




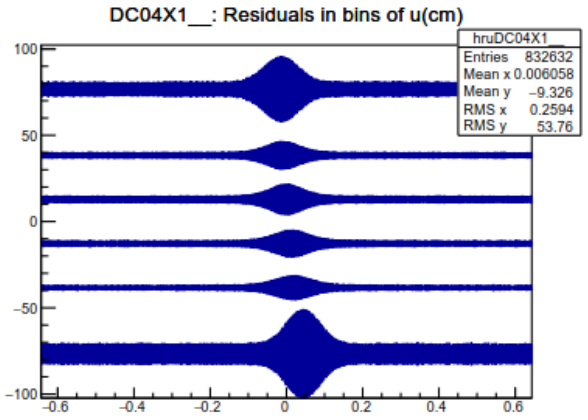
Eff = 91.6%

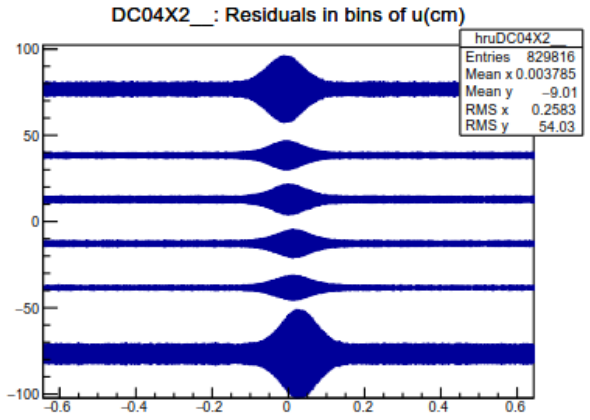


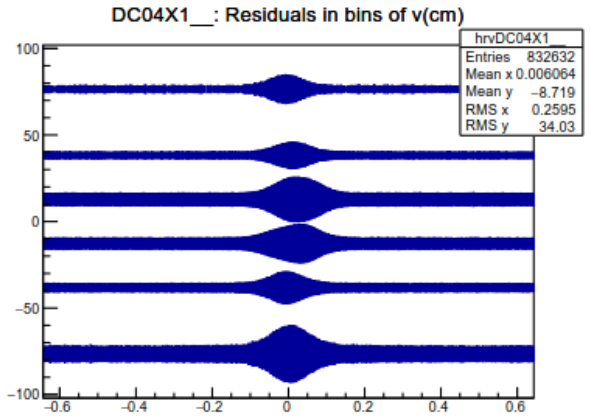


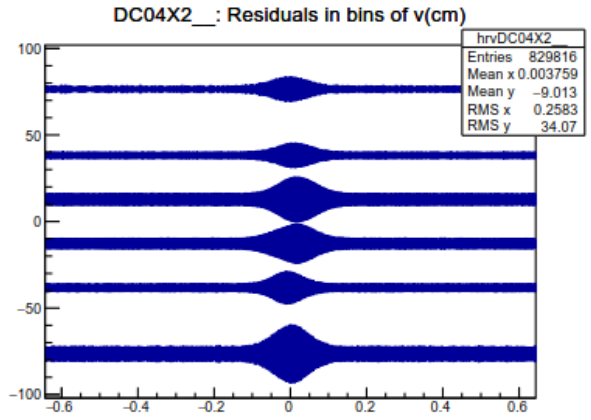


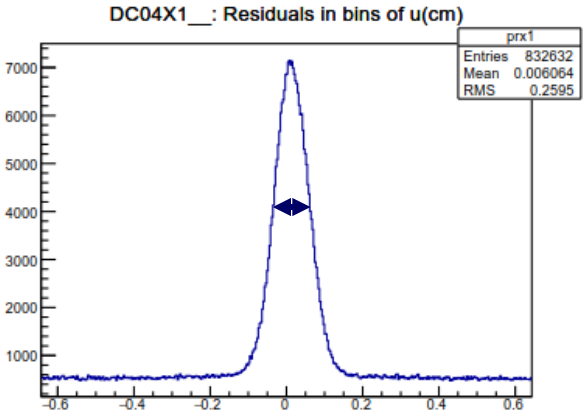
Lower Eff. Due to DC04V Anode HV tuning (leakage)

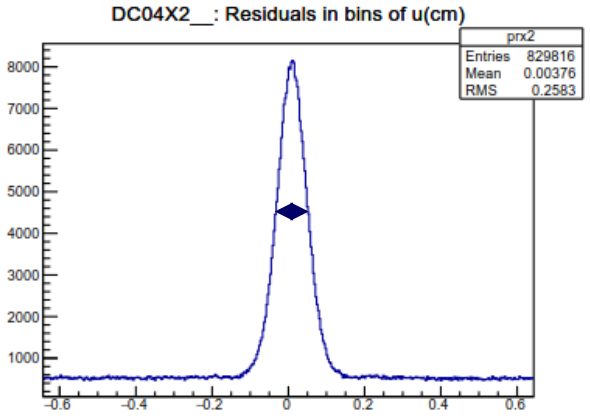


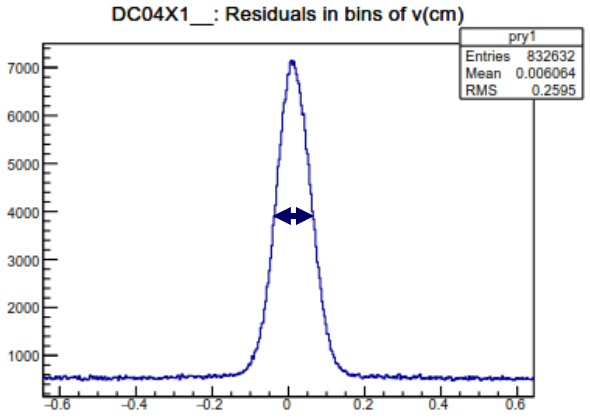


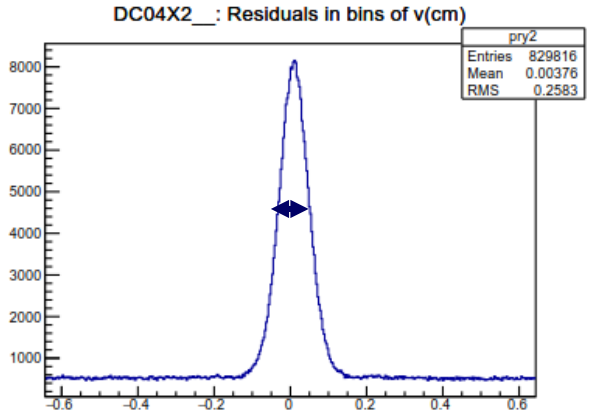










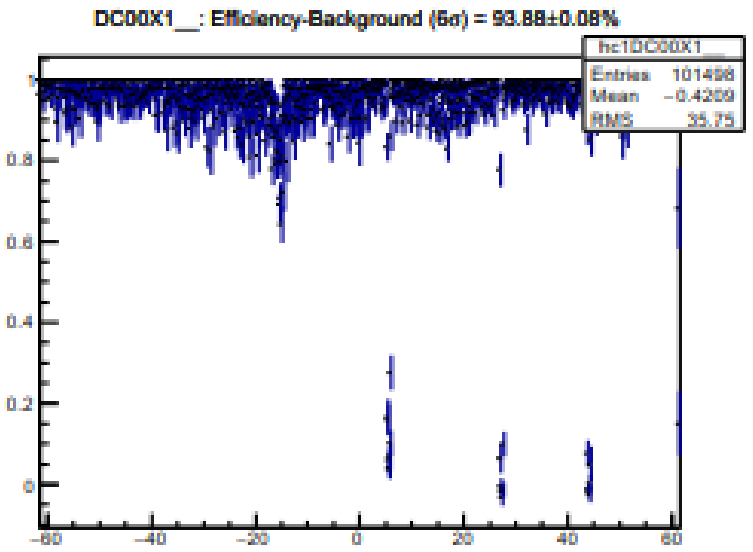


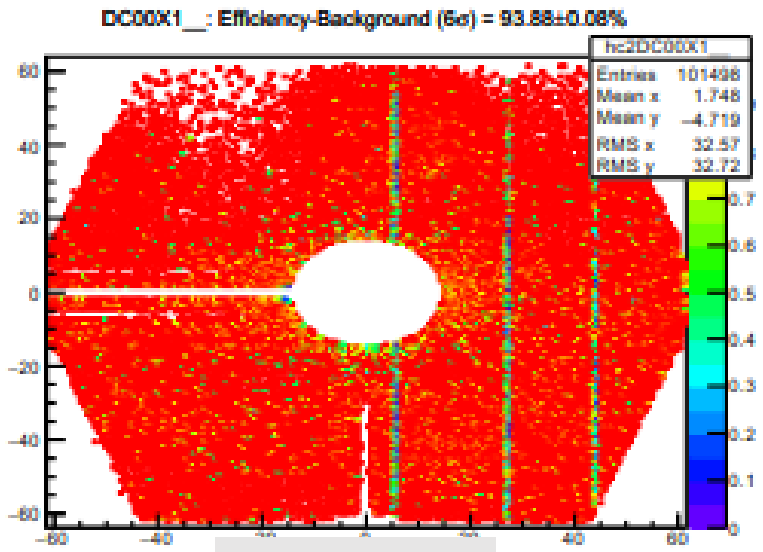
$\sigma_u = \sigma_v \sim 390\ \mu m - \sigma_{track} \sim 250\ \mu m = 300 \mu m$

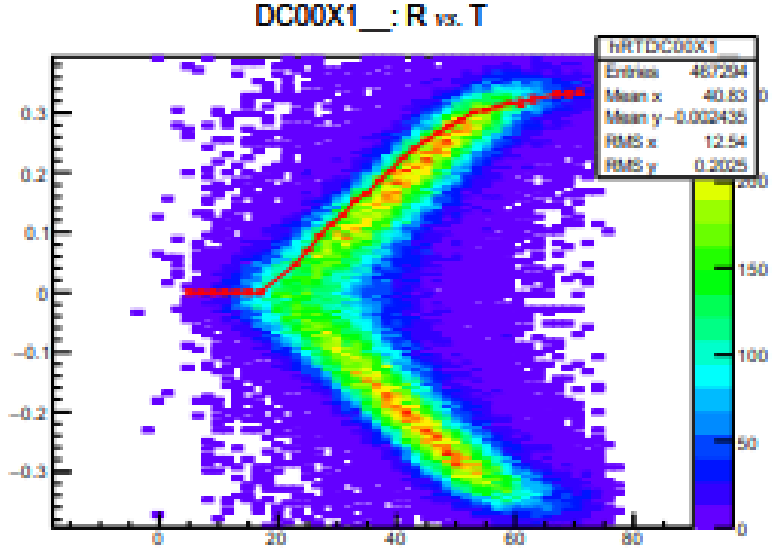
Idem DC04Y, DC04U and DC04V

DC00X1/X2

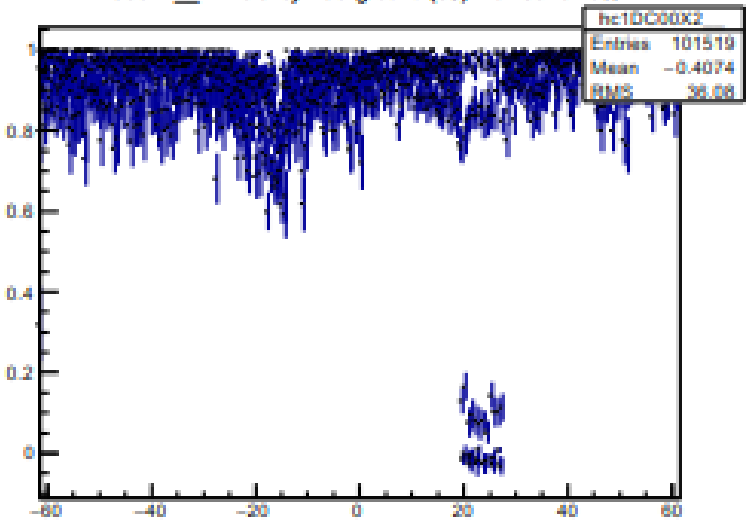
Eff = 93.9%

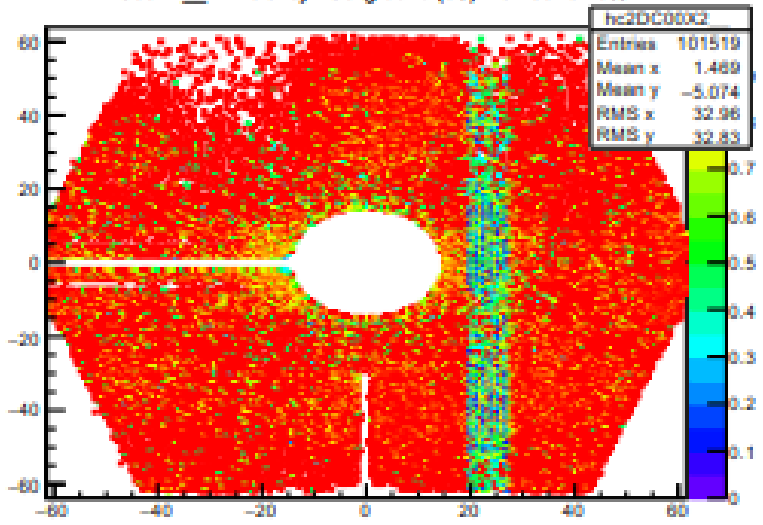


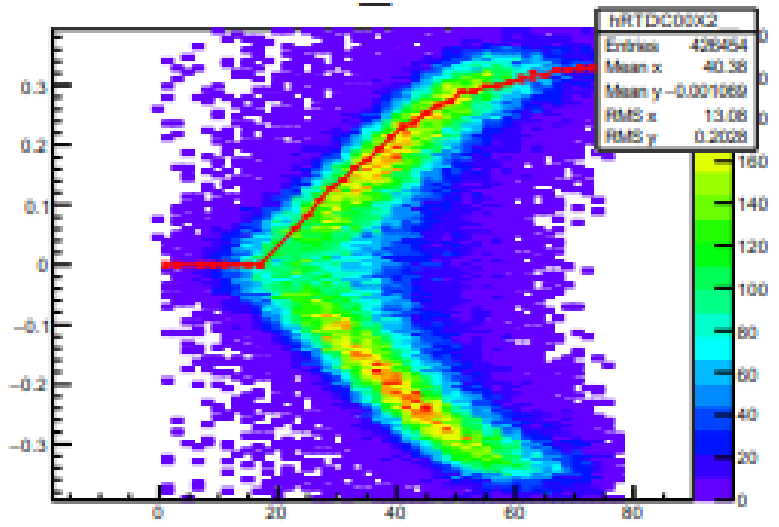




Eff = 87,5%

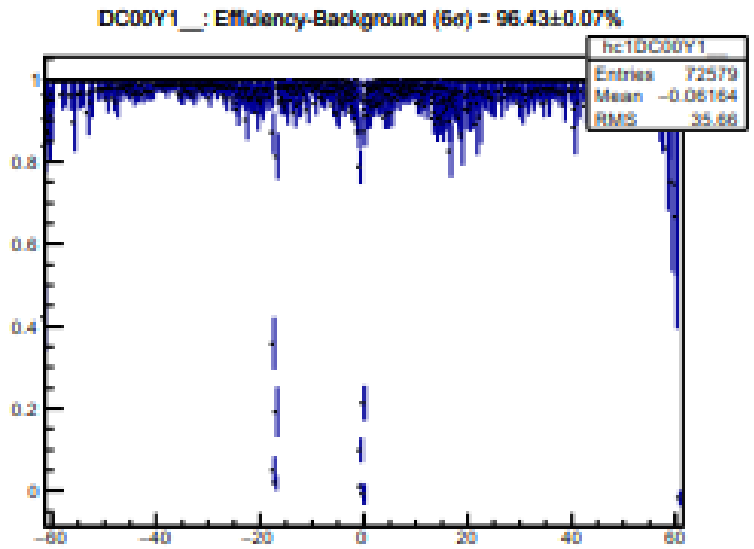


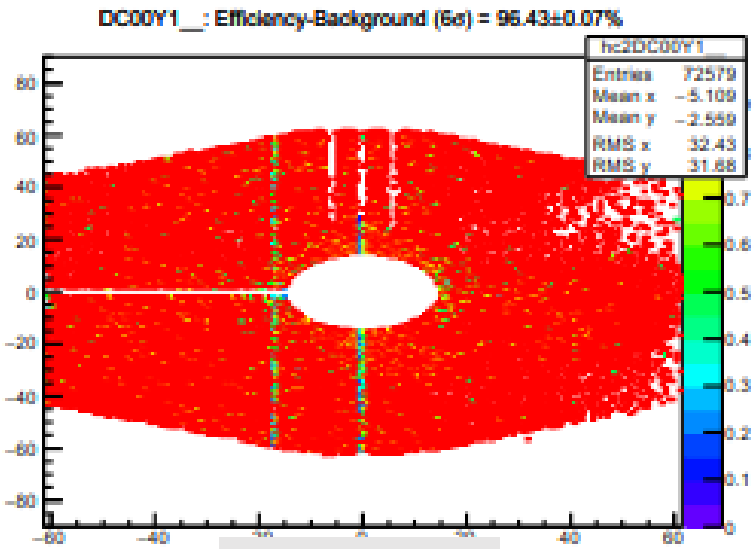


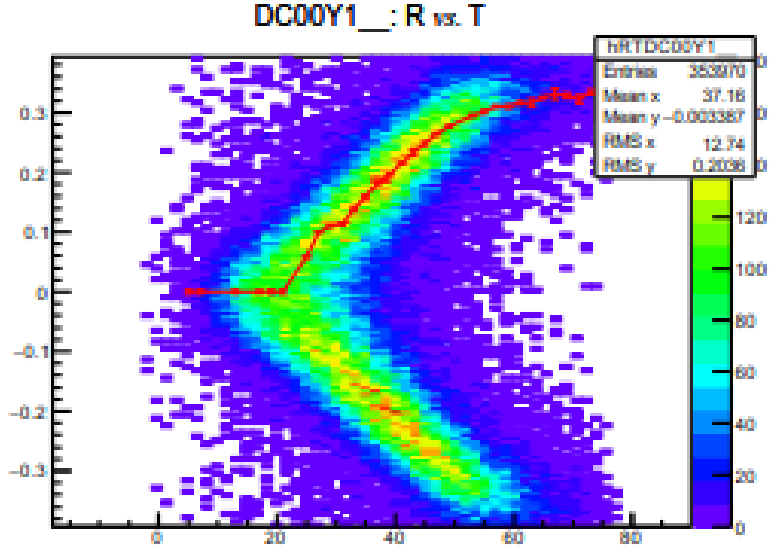


DC00Y1/Y2

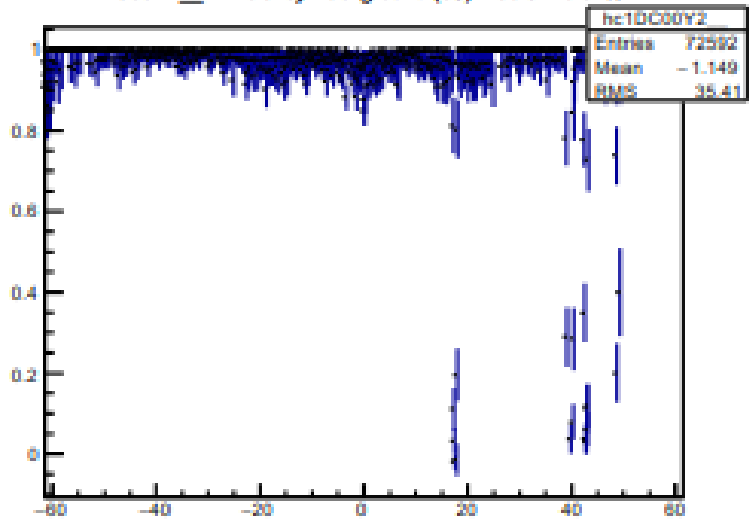
Eff = 96.4%

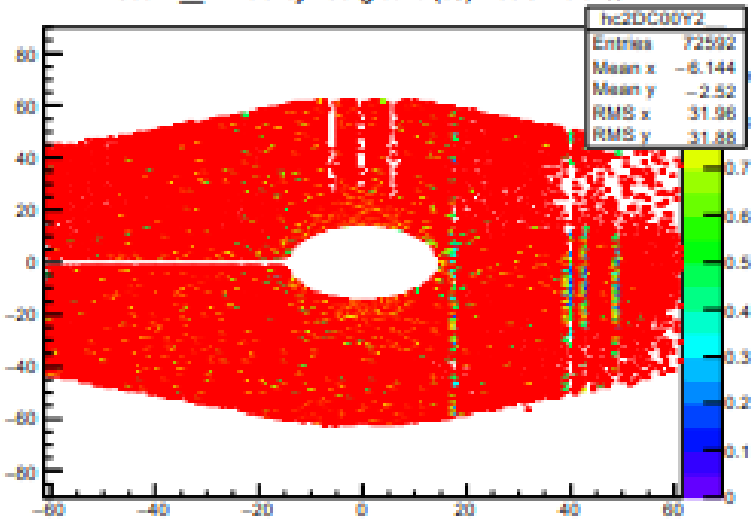


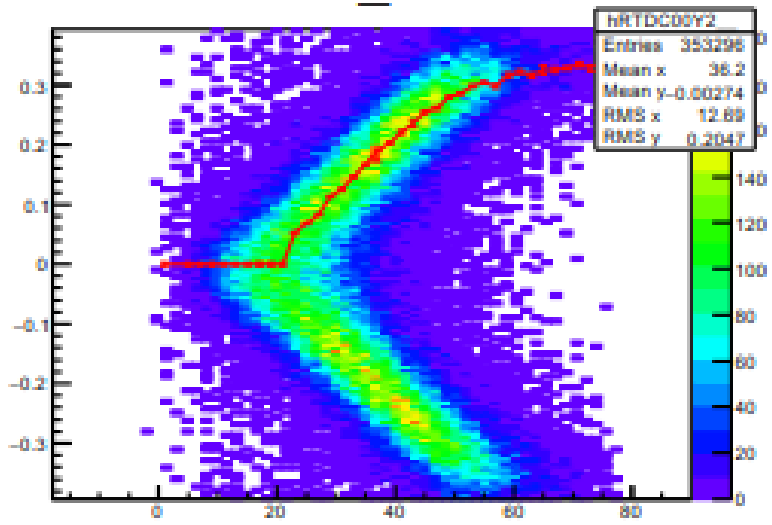




Eff = 96.3%

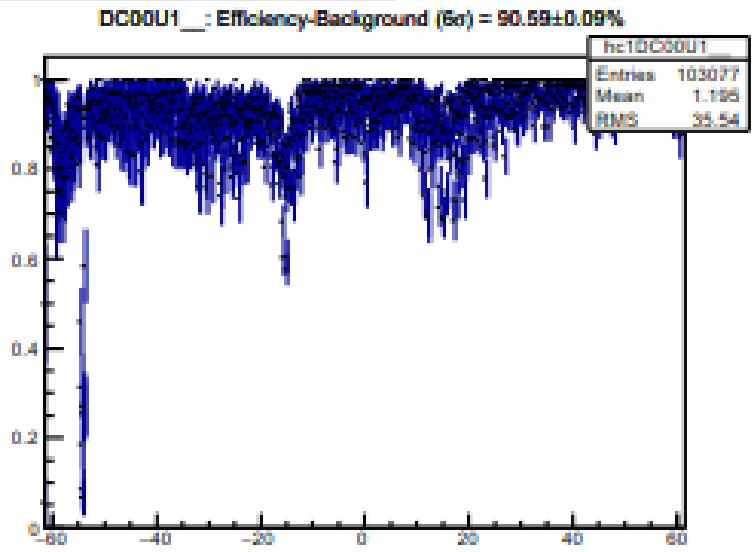


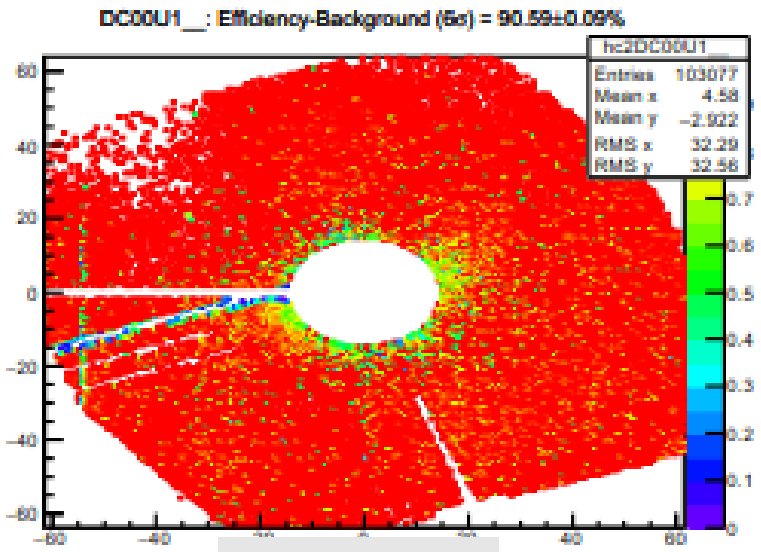


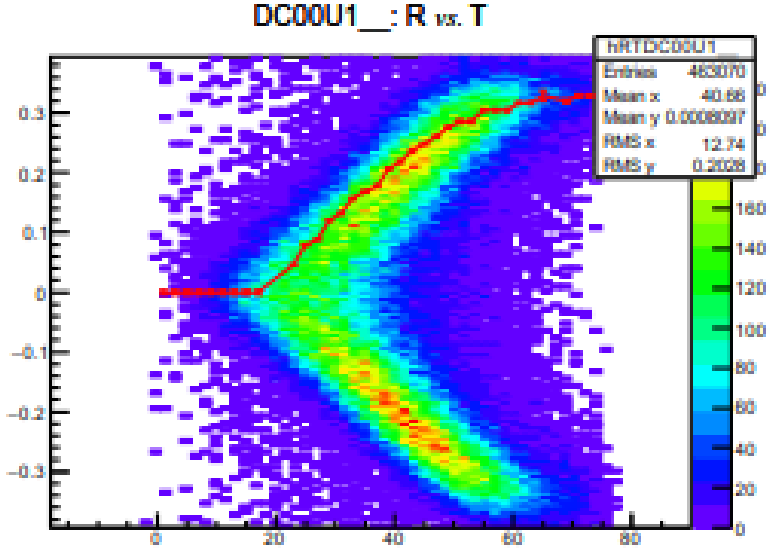


DC00U1/U2

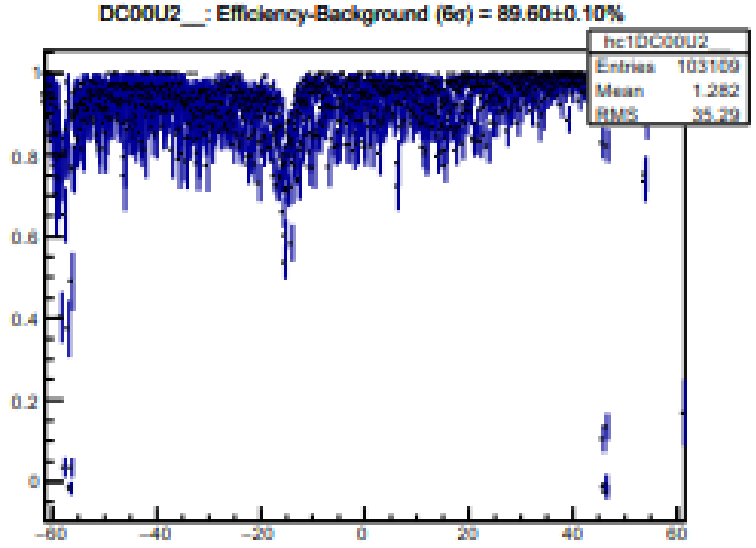
Eff = 90.6%

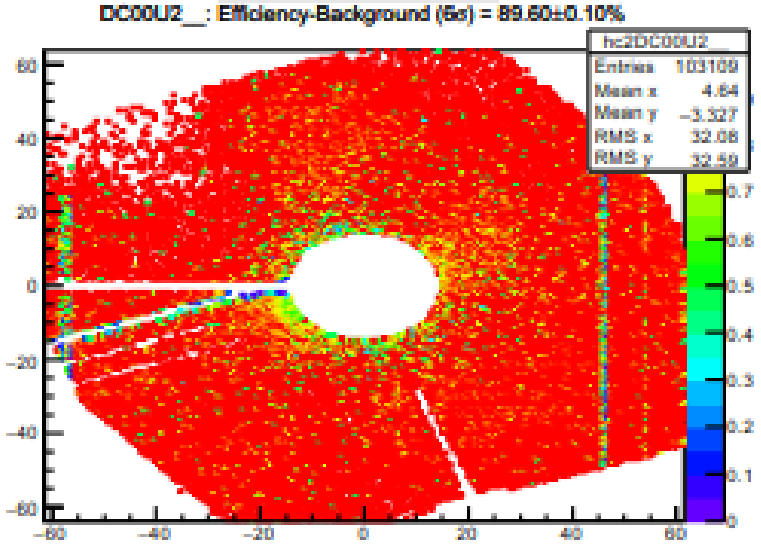


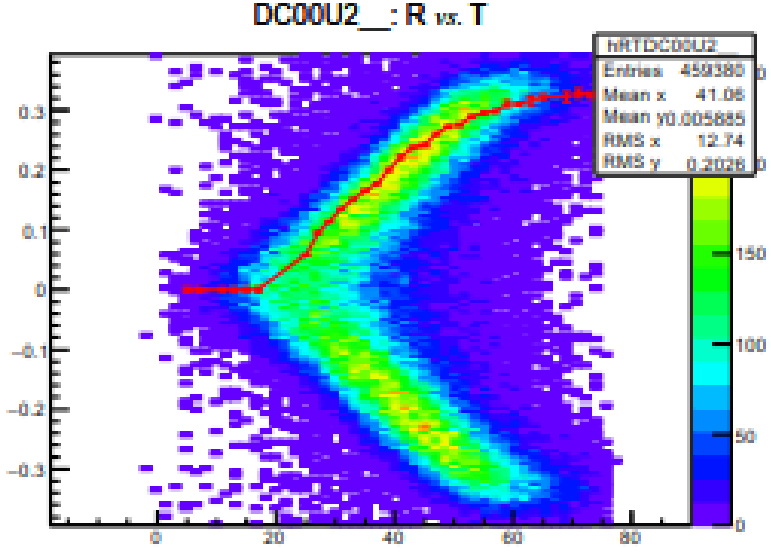




Eff = 89.6%

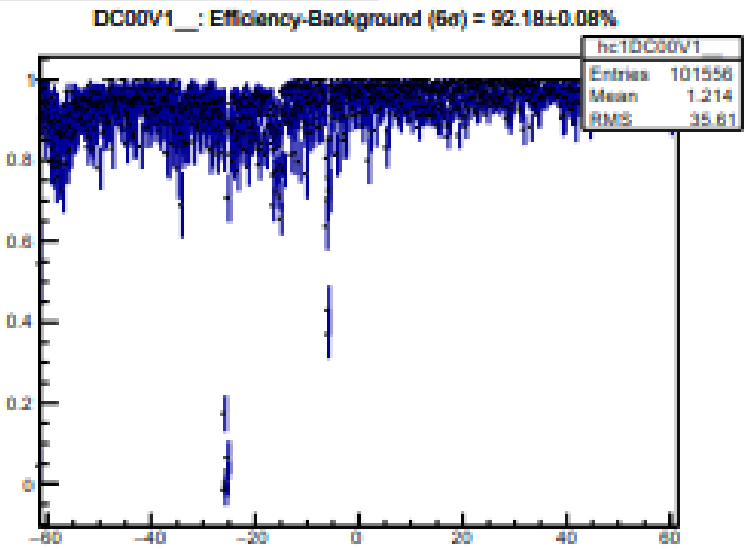


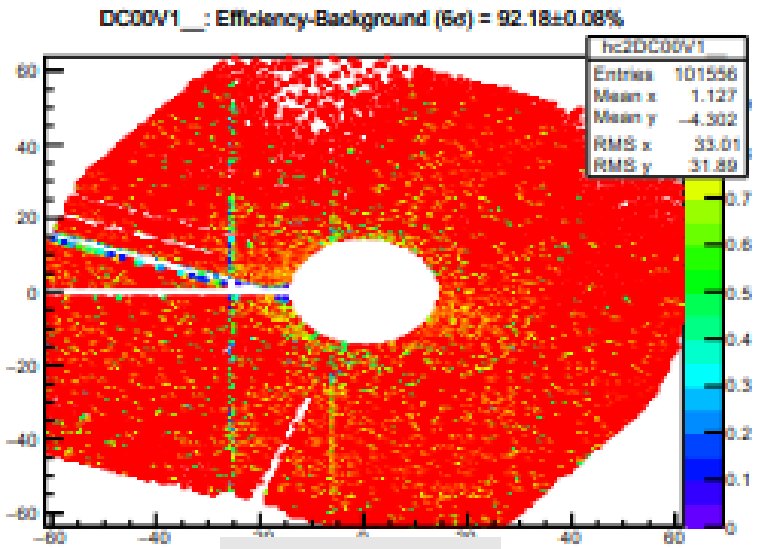


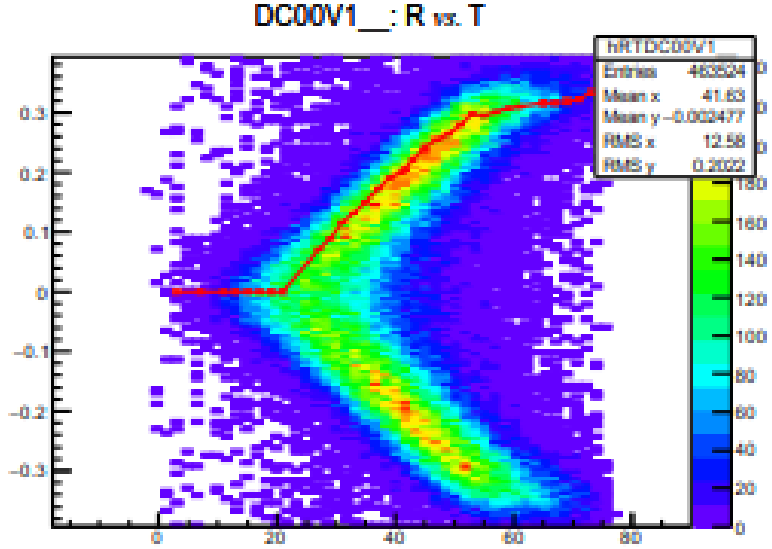


DC00V1/V2

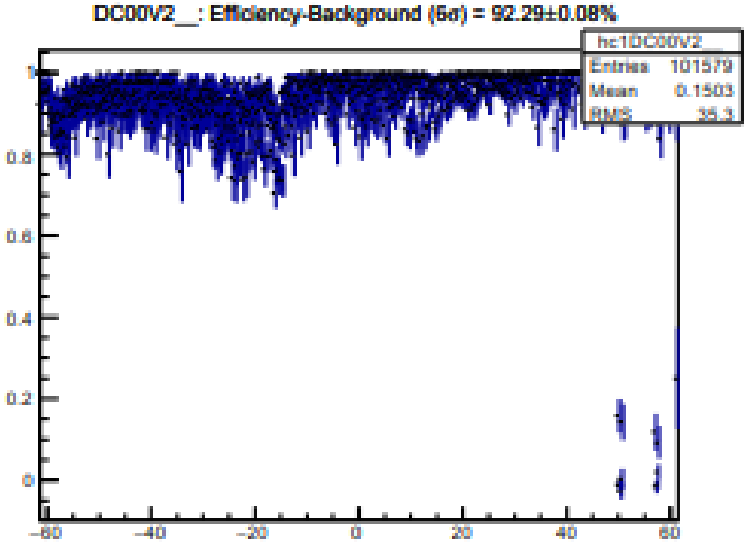
Eff = 92.2%

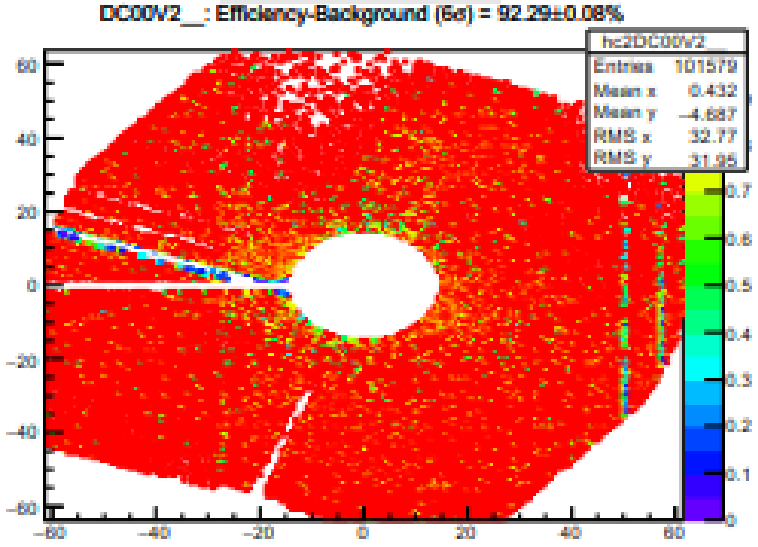


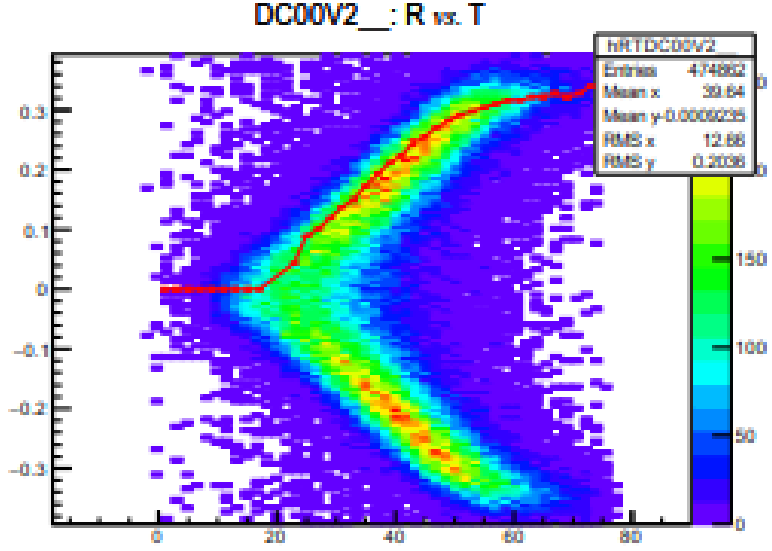




Eff = 92.3%

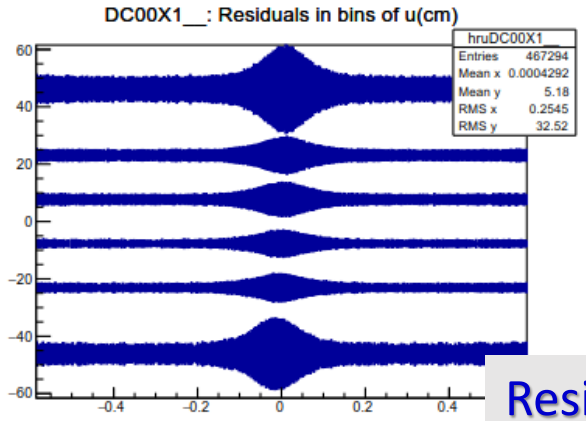


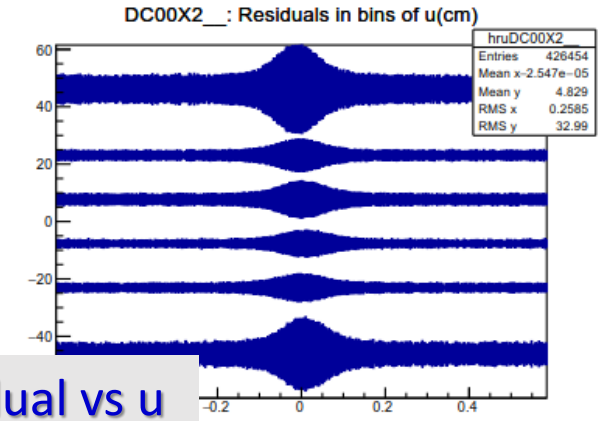




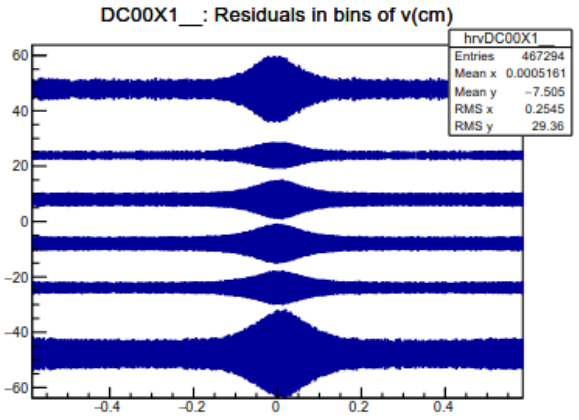
DC00X1/X2

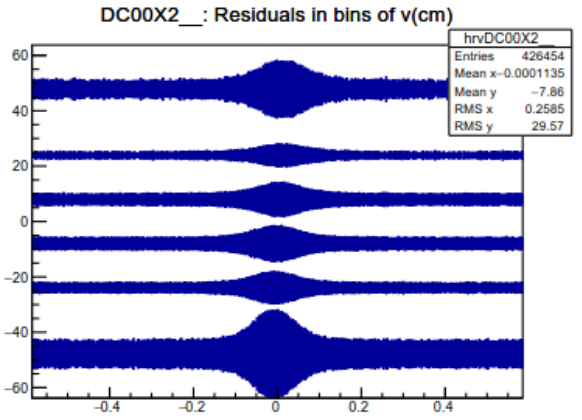
Residual vs u



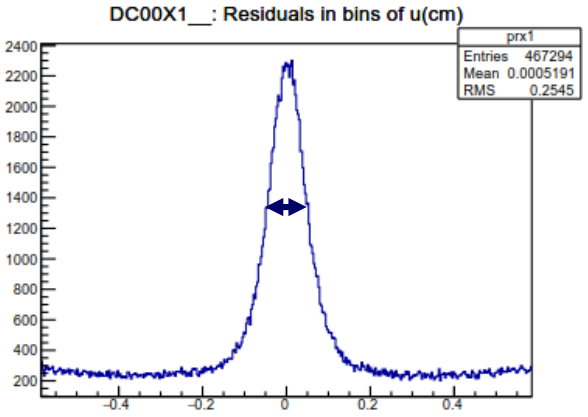


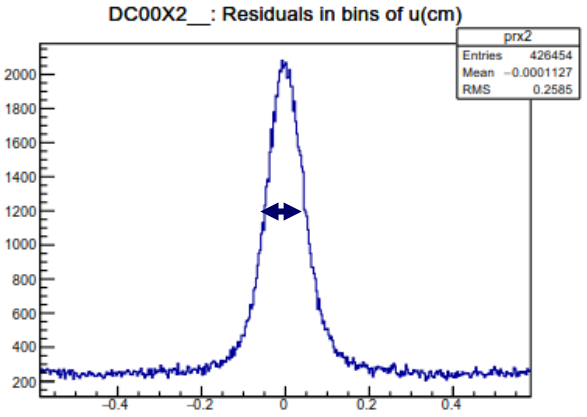
Residual vs v

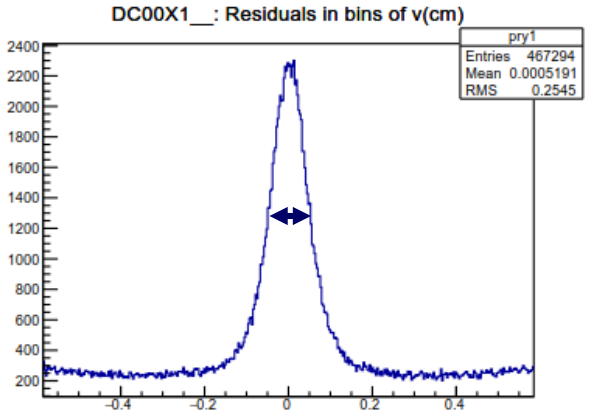


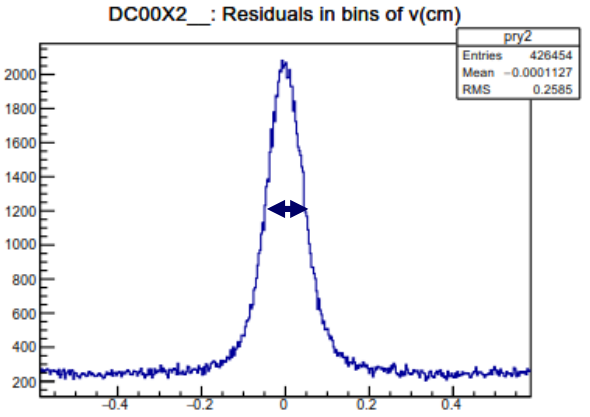


Residual vs u







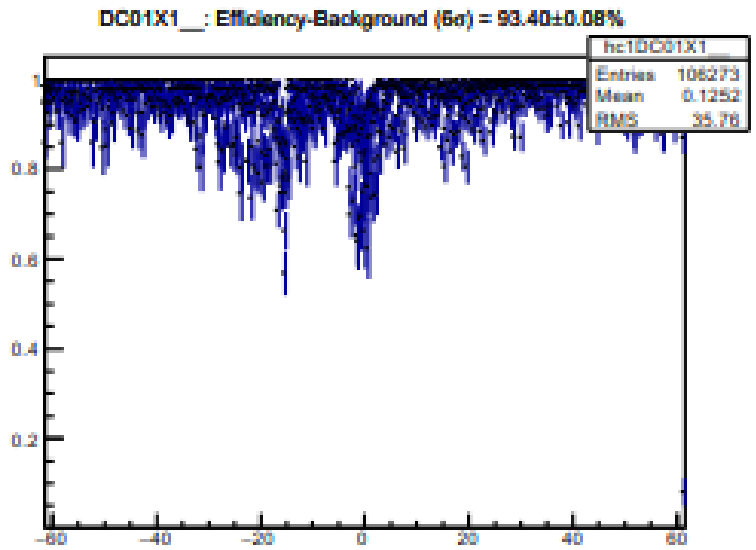


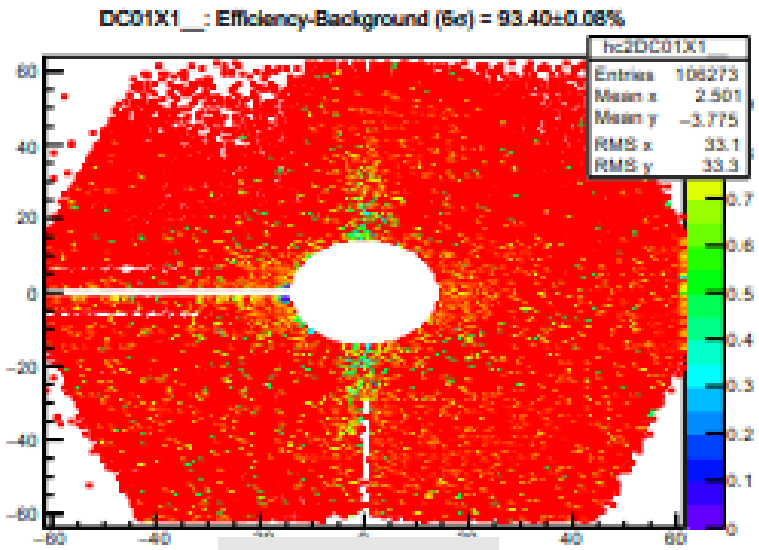
$\sigma_u = \sigma_v \sim 380\ \mu m - \sigma_{track} \sim 250\ \mu m = 280\ \mu m$

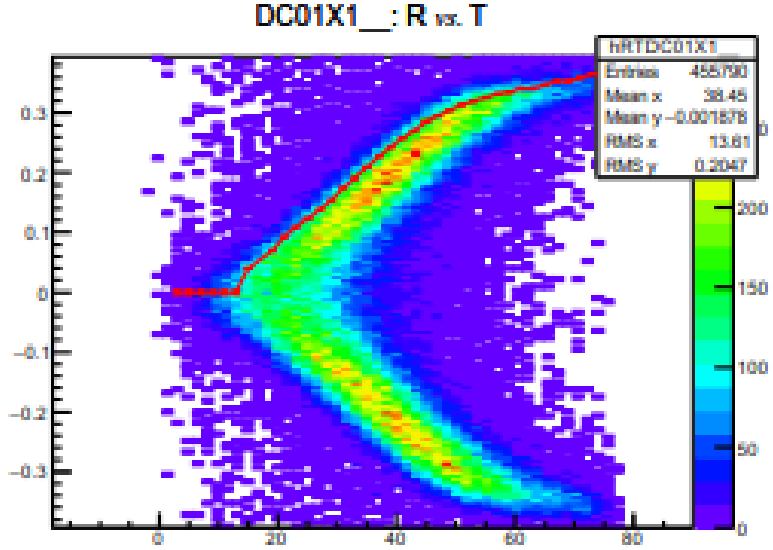
$\sigma_{position}$ is OK - Idem DC00Y, DC00U and DC00V

DC01X1/X2

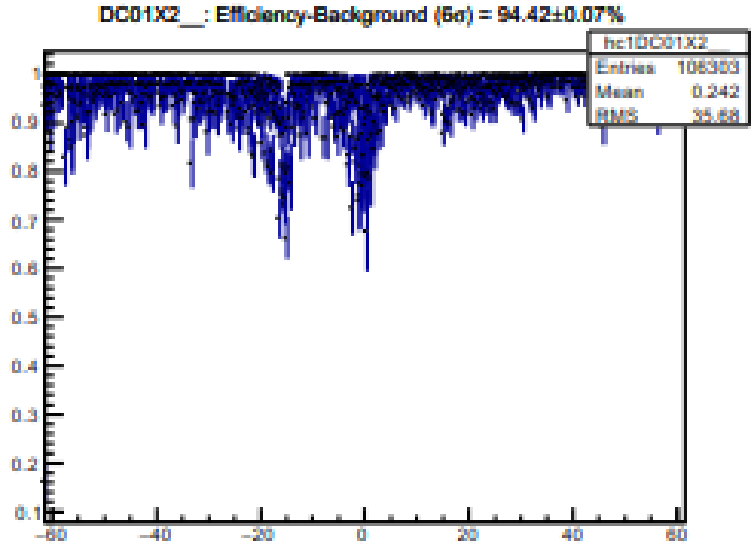
Eff = 93.4%

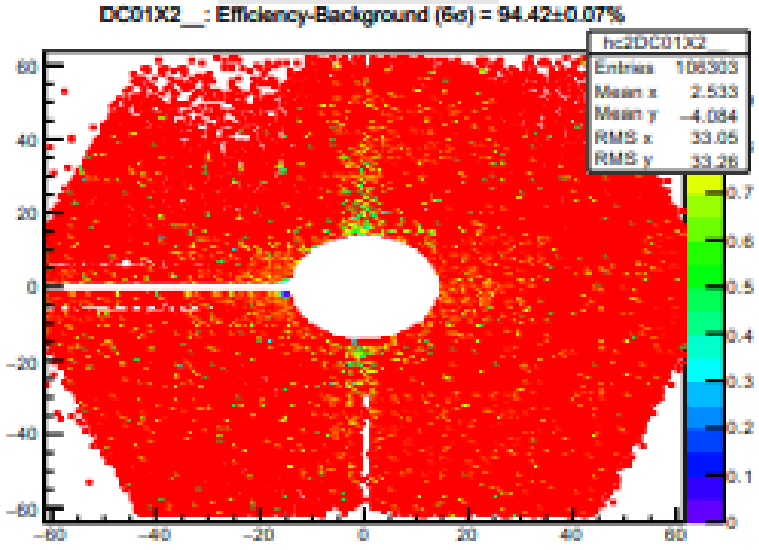


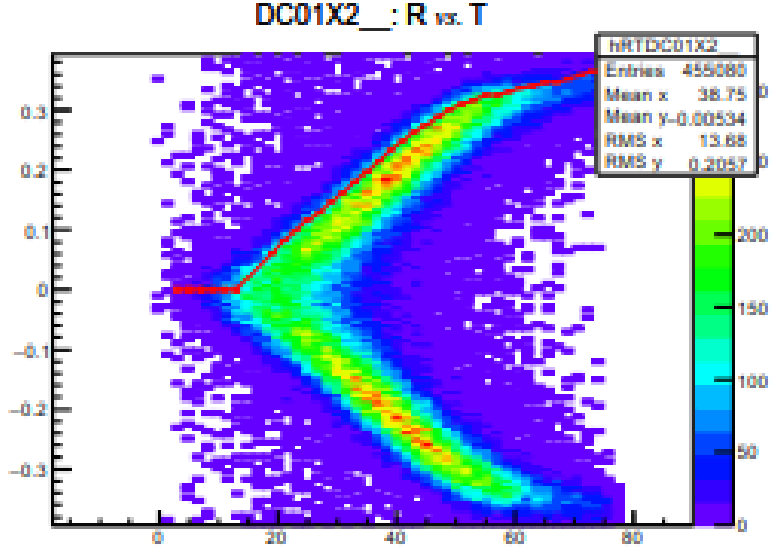




Eff = 94.4%

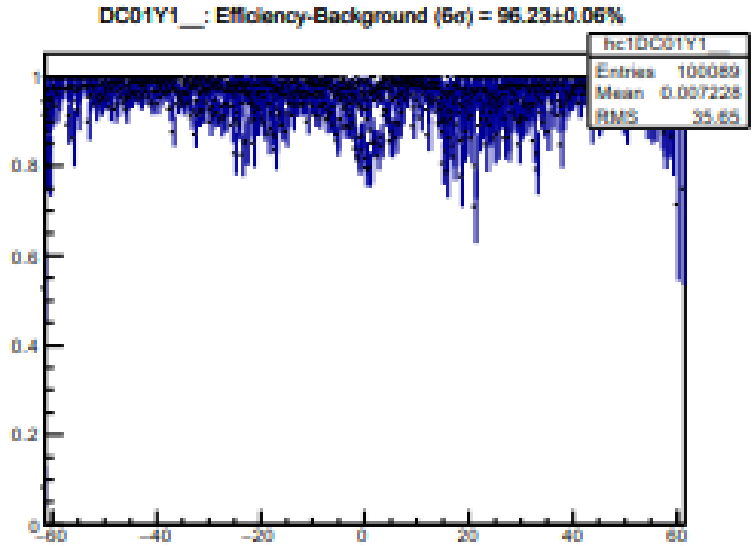


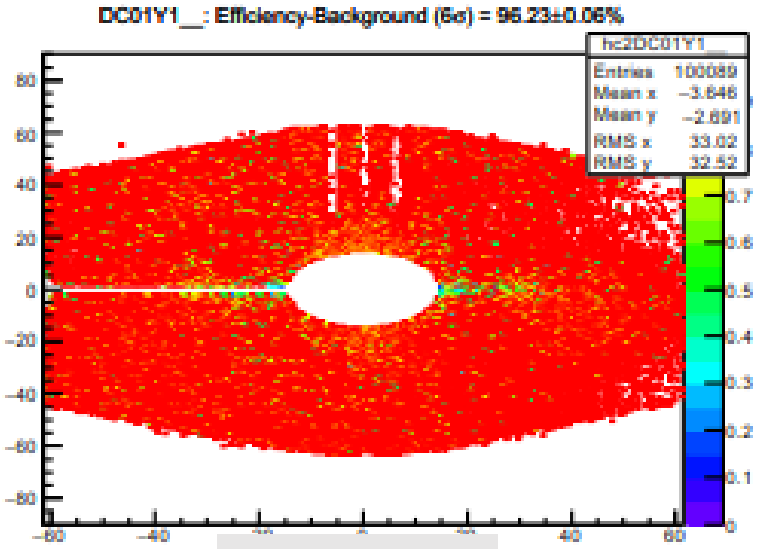


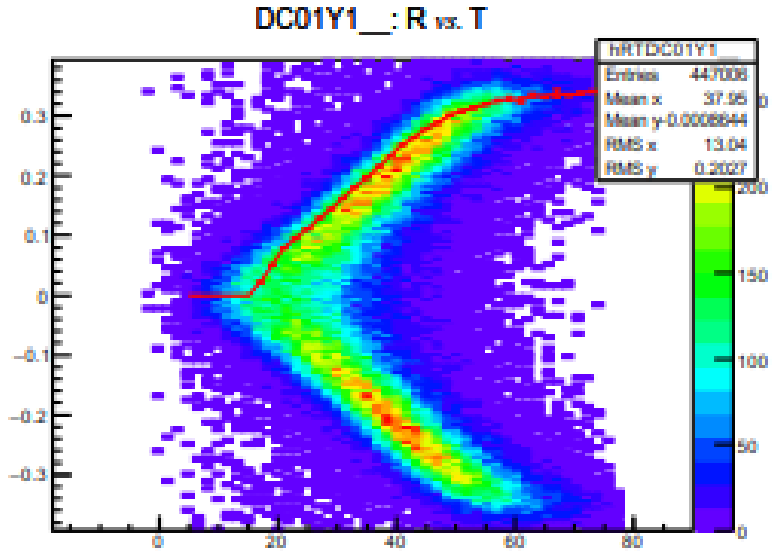


DC01Y1/Y2

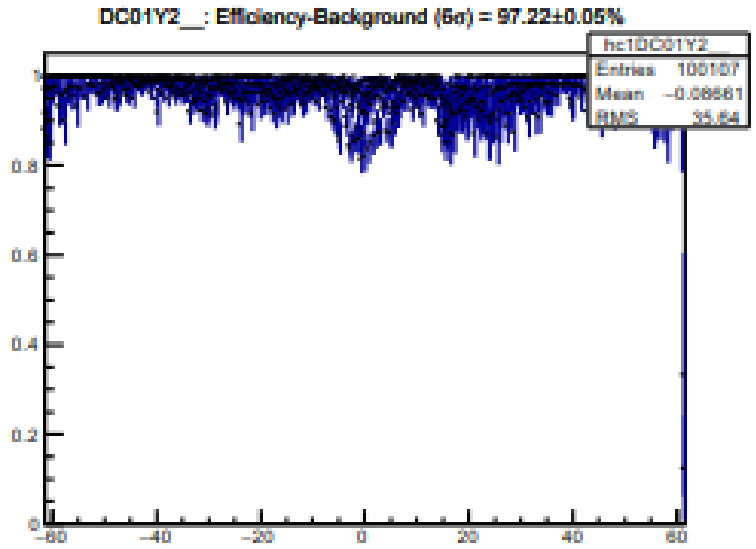
Eff = 96.2%

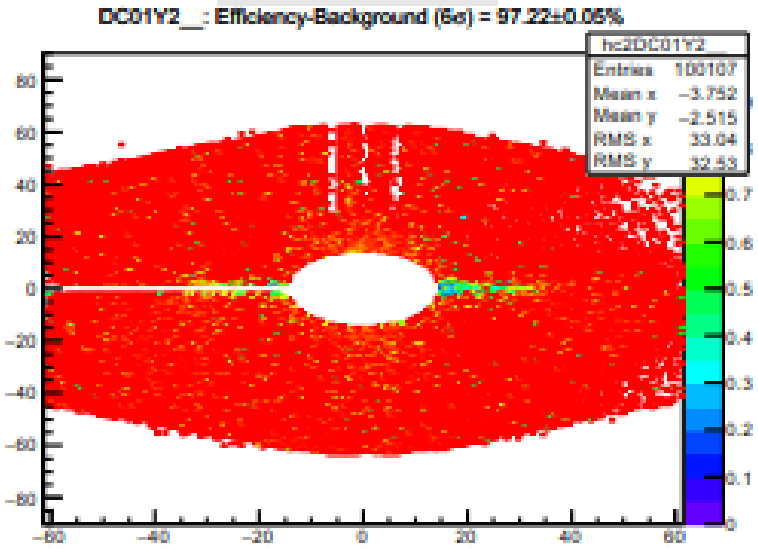


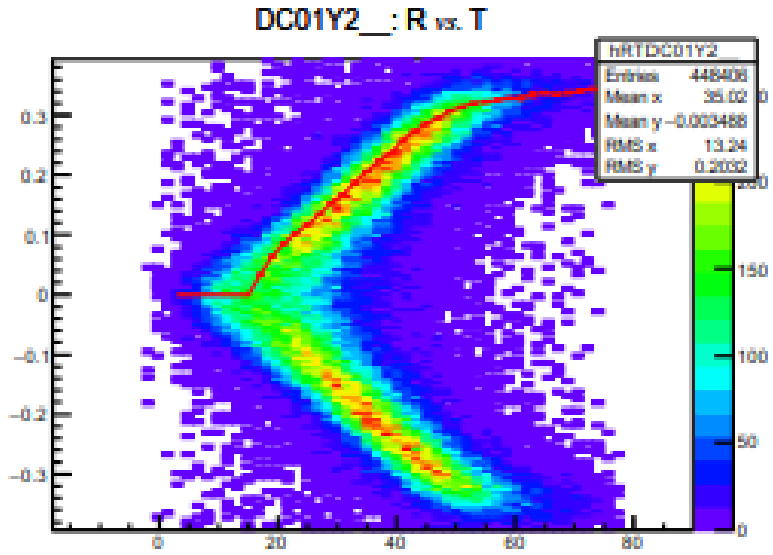




Eff = 97.2%

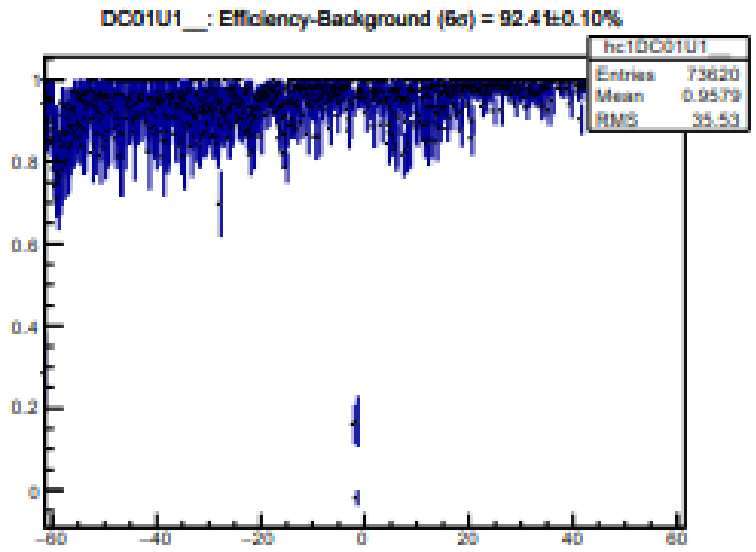


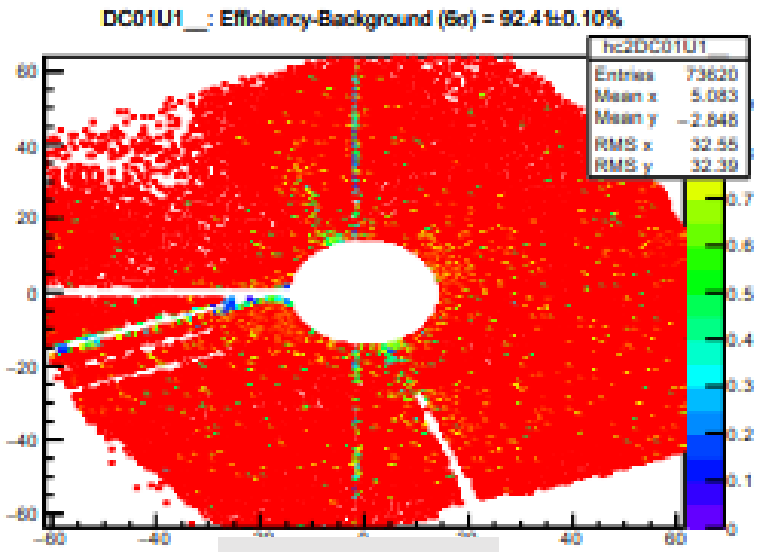


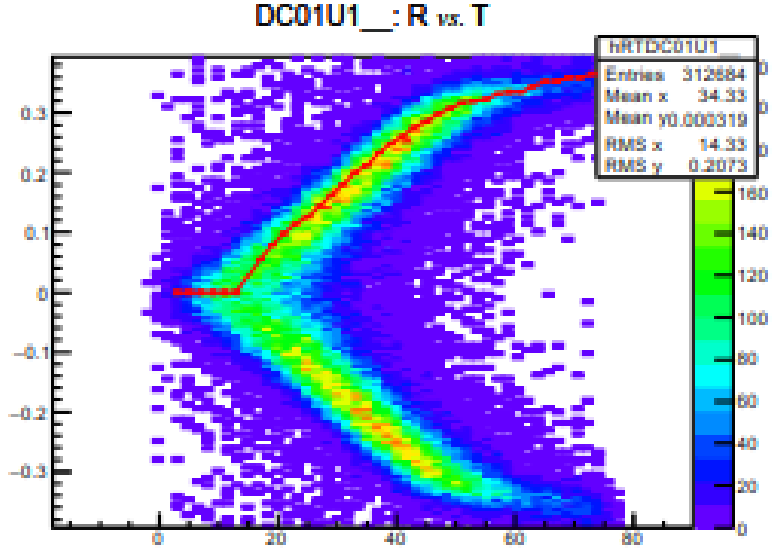


DC01U1/U2

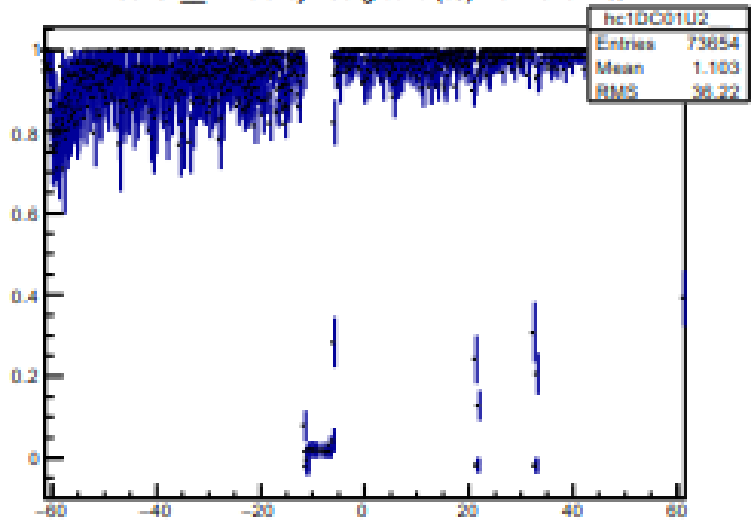
Eff = 92.4%

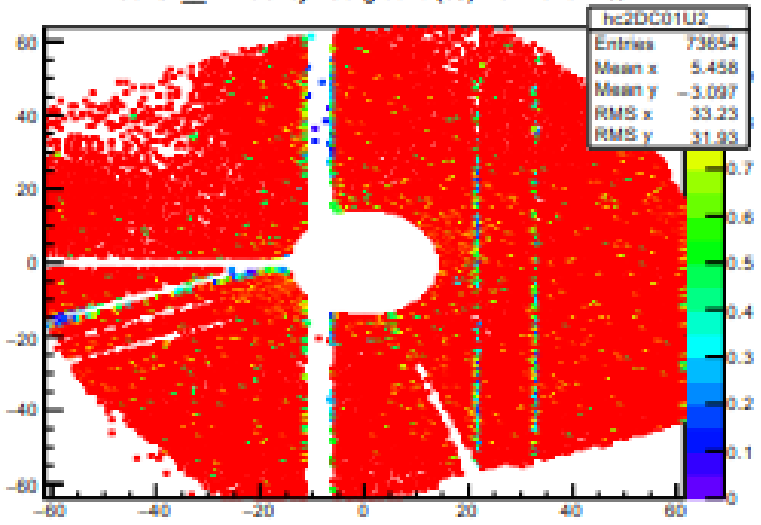


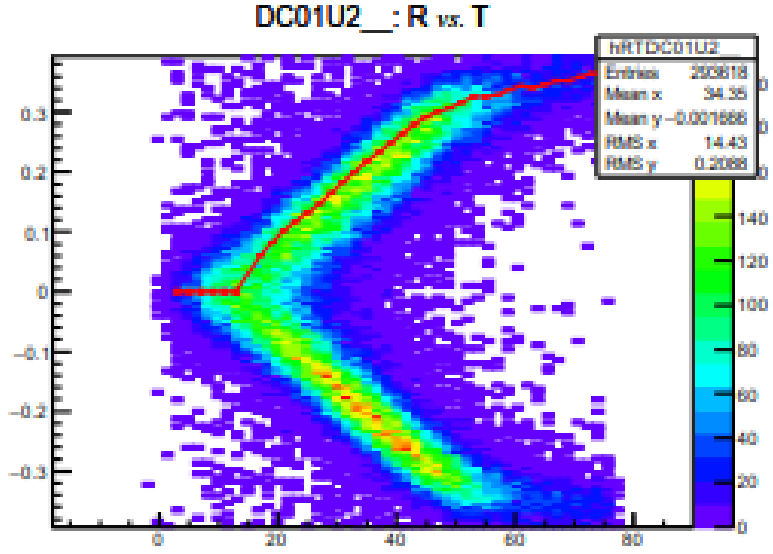




Eff = 87.3%

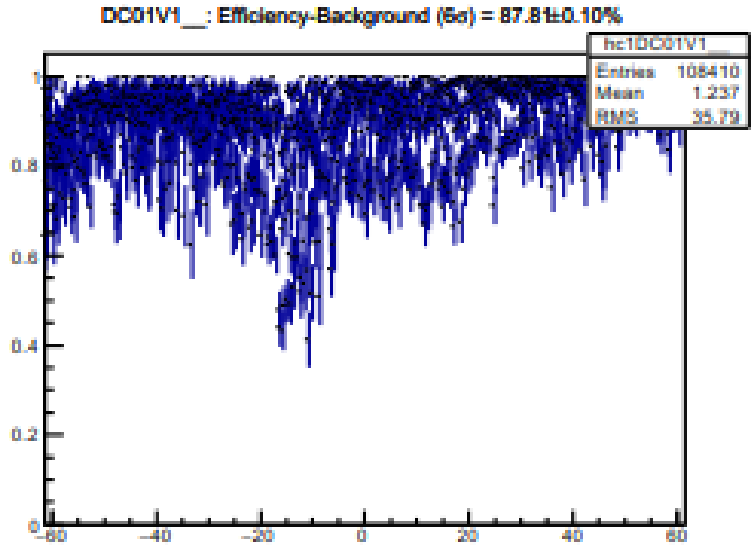


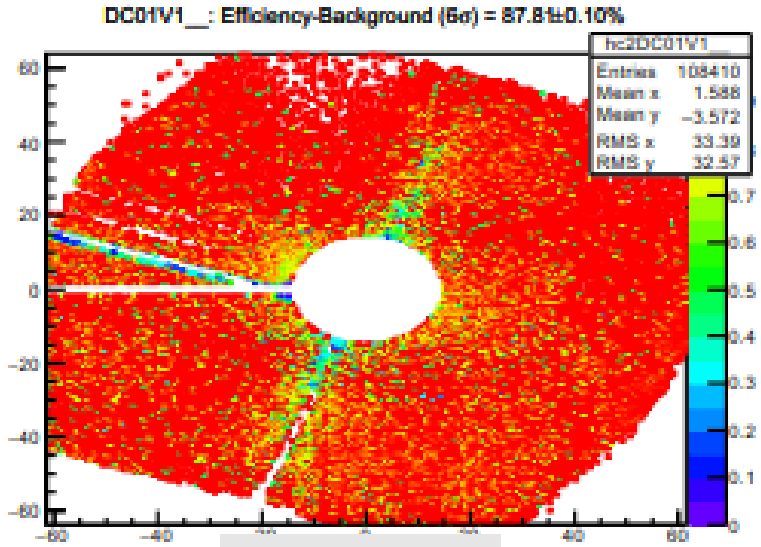


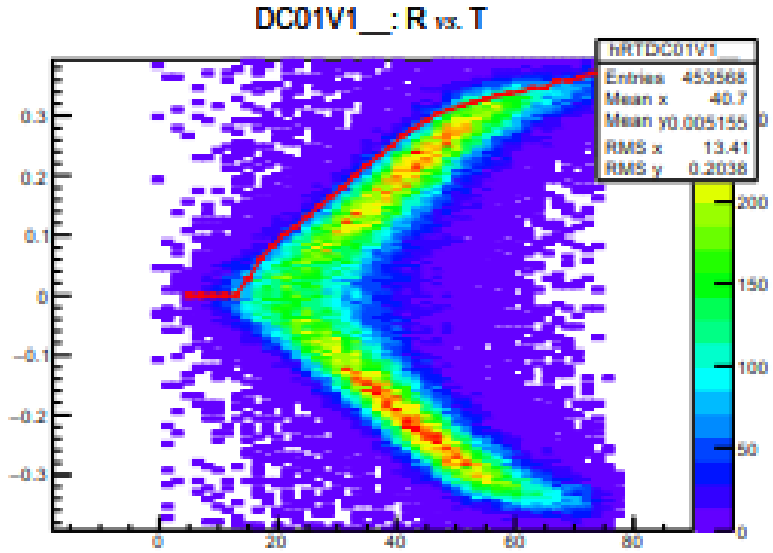


DC01V1/V2

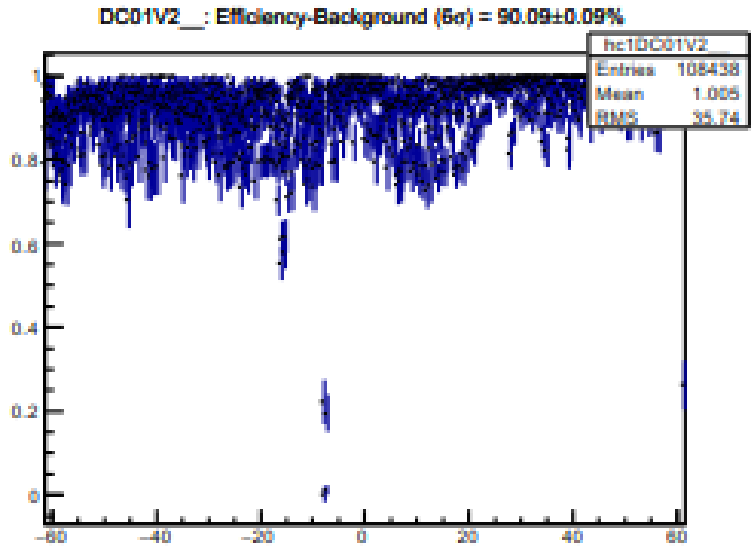
Eff = 87.8%

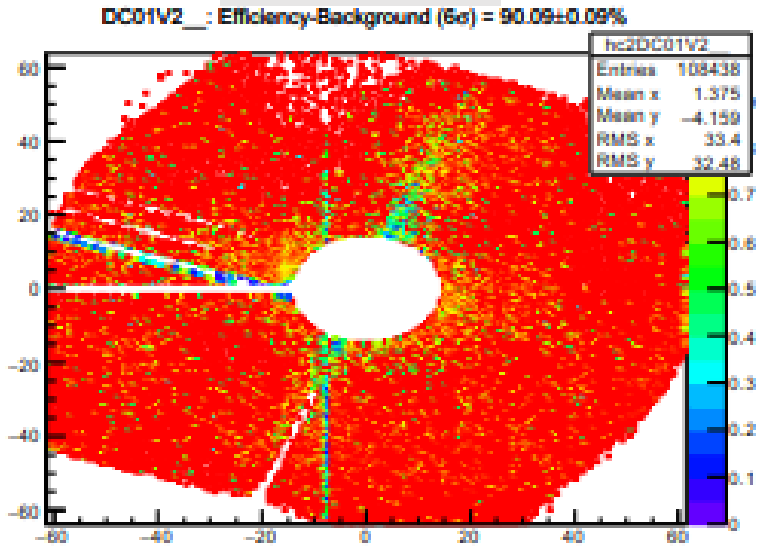


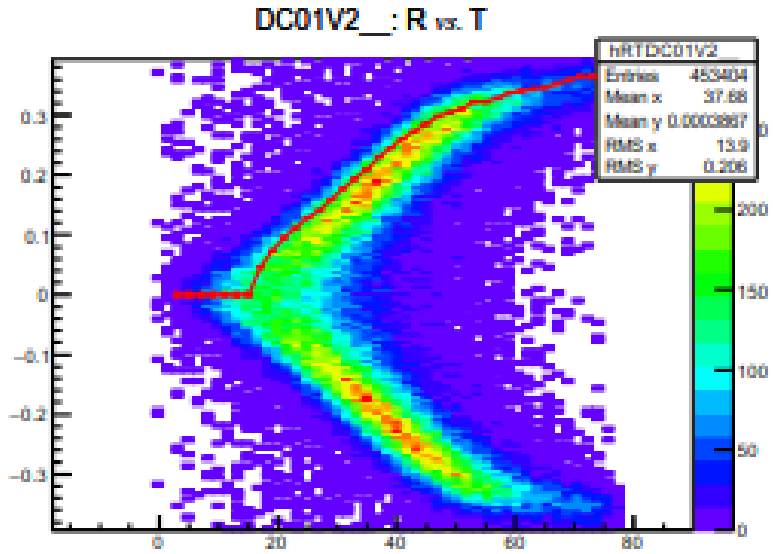




Eff = 90.1%

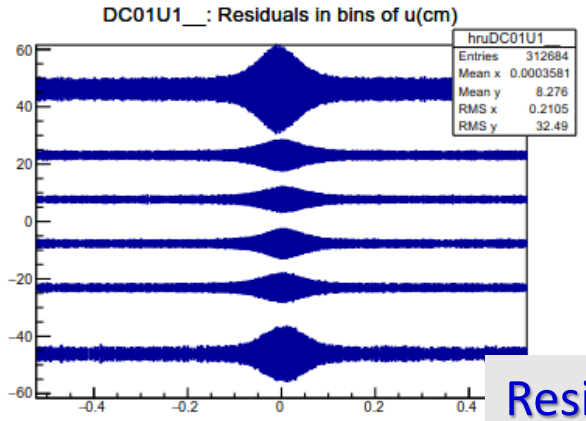


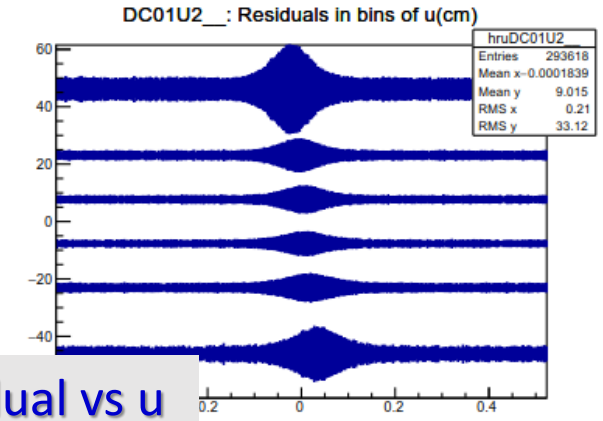




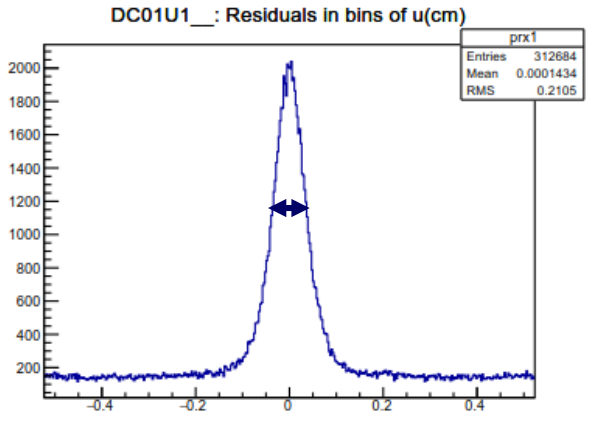
DC01U1/U2

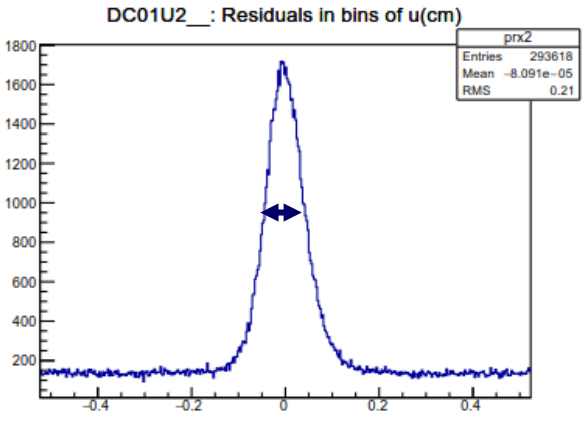
Residual vs u



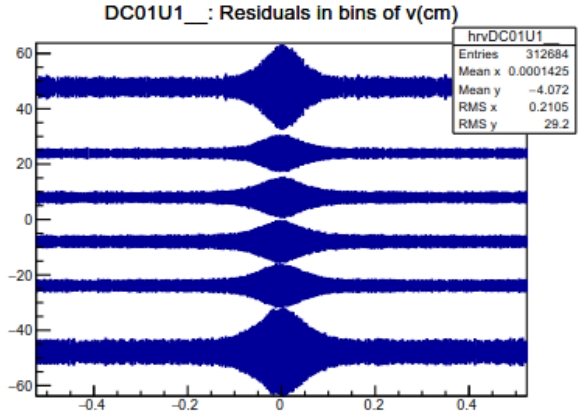


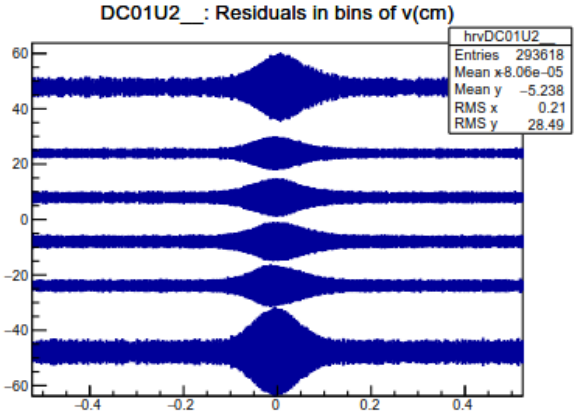
Residual vs u

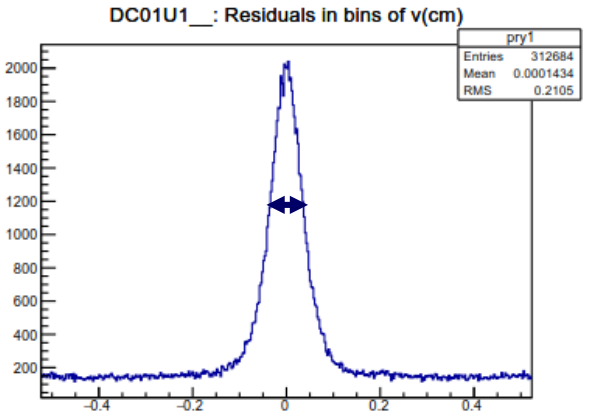


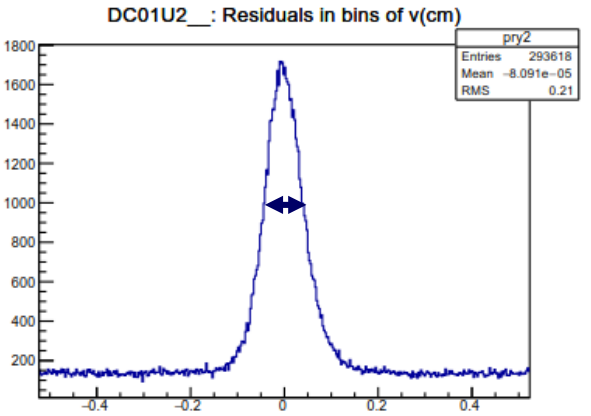


Residual vs v







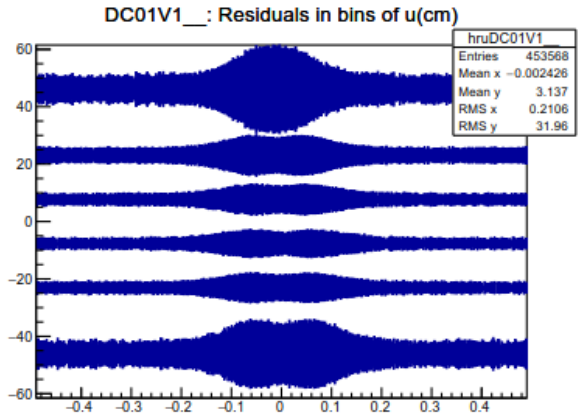


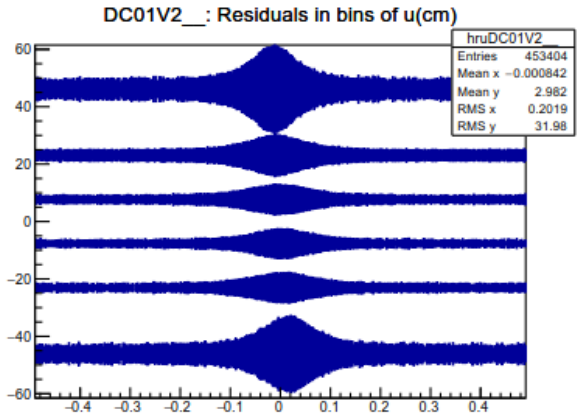
$\sigma U1_u = \sigma U1_v \sim 320\ \mu m \quad \sigma U2_u = \sigma U2_v \sim 380\ \mu m$

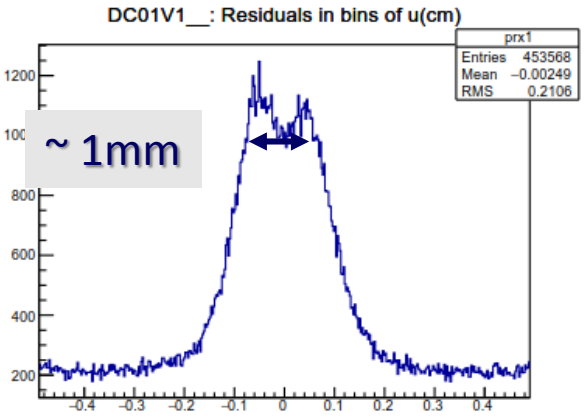
$\sigma_{position}$ is OK - Idem DC01X, DC01Y

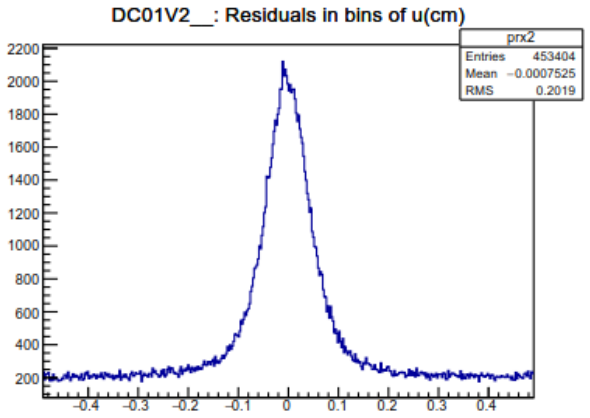
DC01V1/V2

Residual vs u

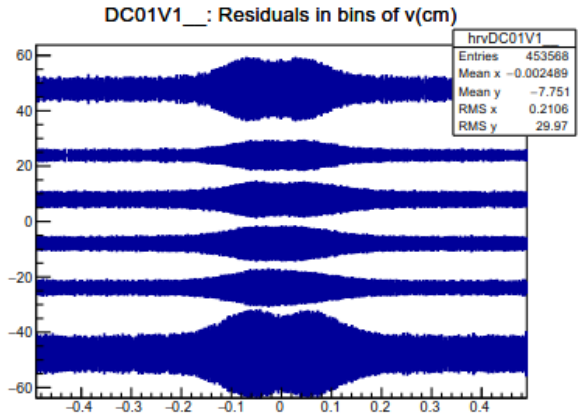


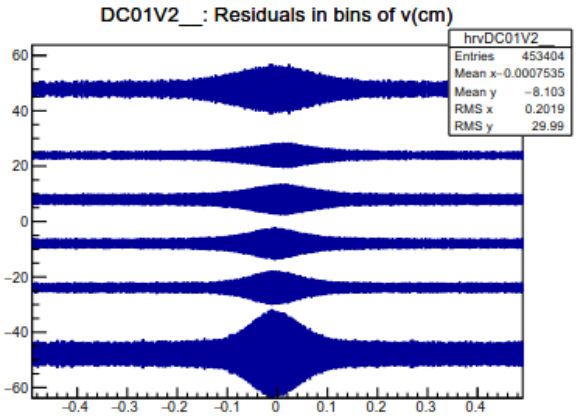


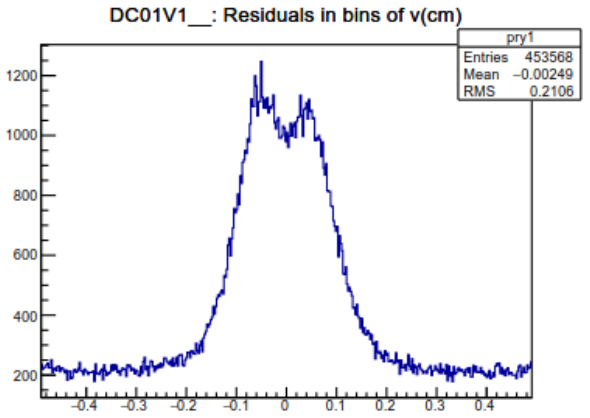


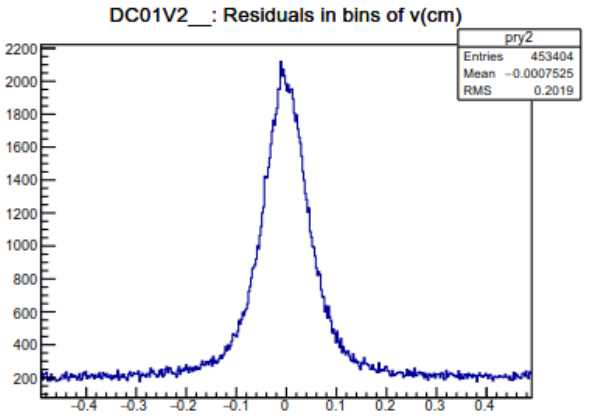


Residual vs v









u-resolution degraded due to shifted RT

DC01X/Y/V RT should be re-fitted

DVCS run 2017 Status of Saclay DCs (by Charles J. Naim)

- DC04X/DC04Y/DC04U/DC04V All OK
- DC00X/DC00Y/DC00U/DC00V All OK
- DC01X/DC01Y/DC01U/DC01V Refit RTs