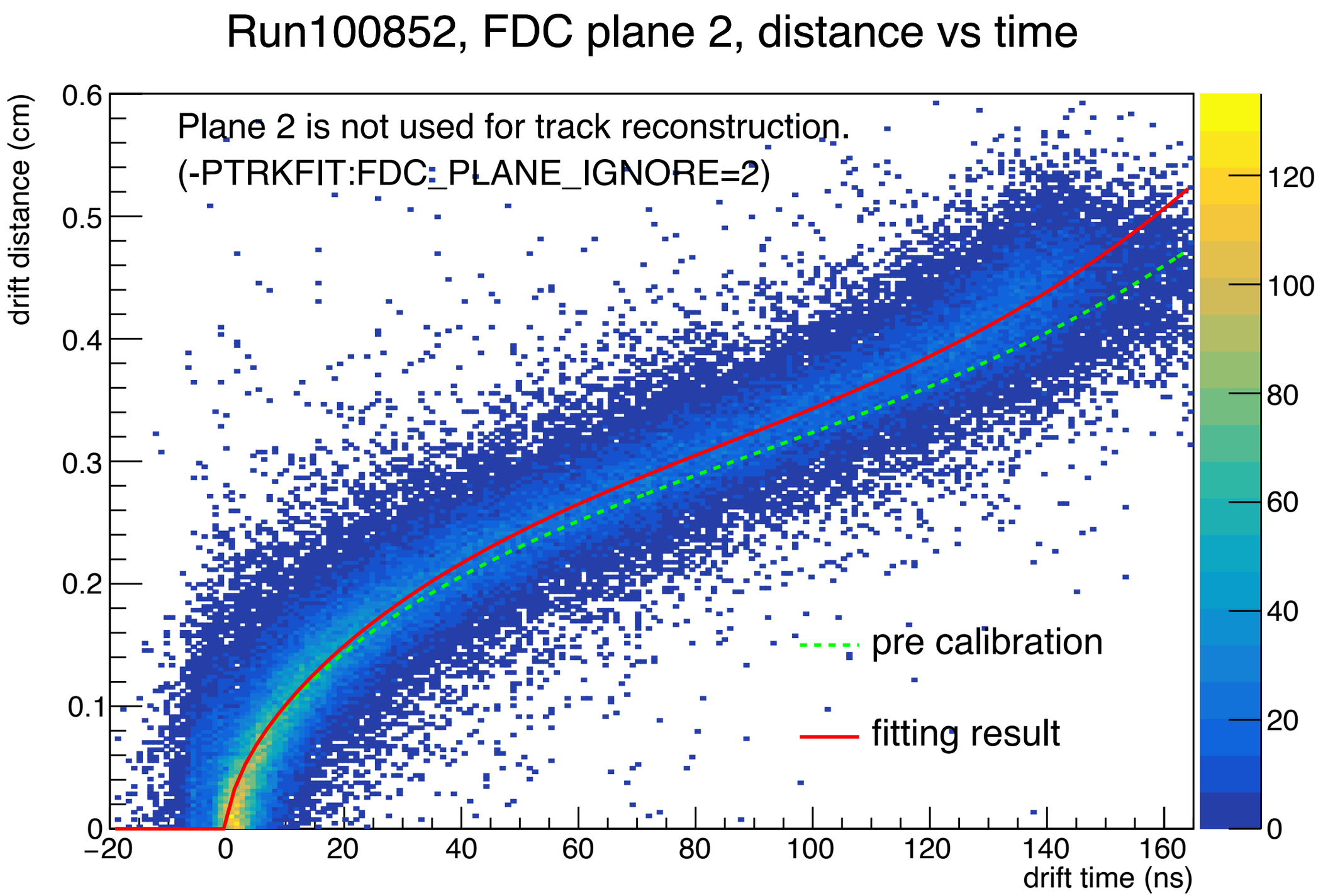
Straight track run check (FDC)

Keigo Mizutani

7 July 2022

Tracking Meeting

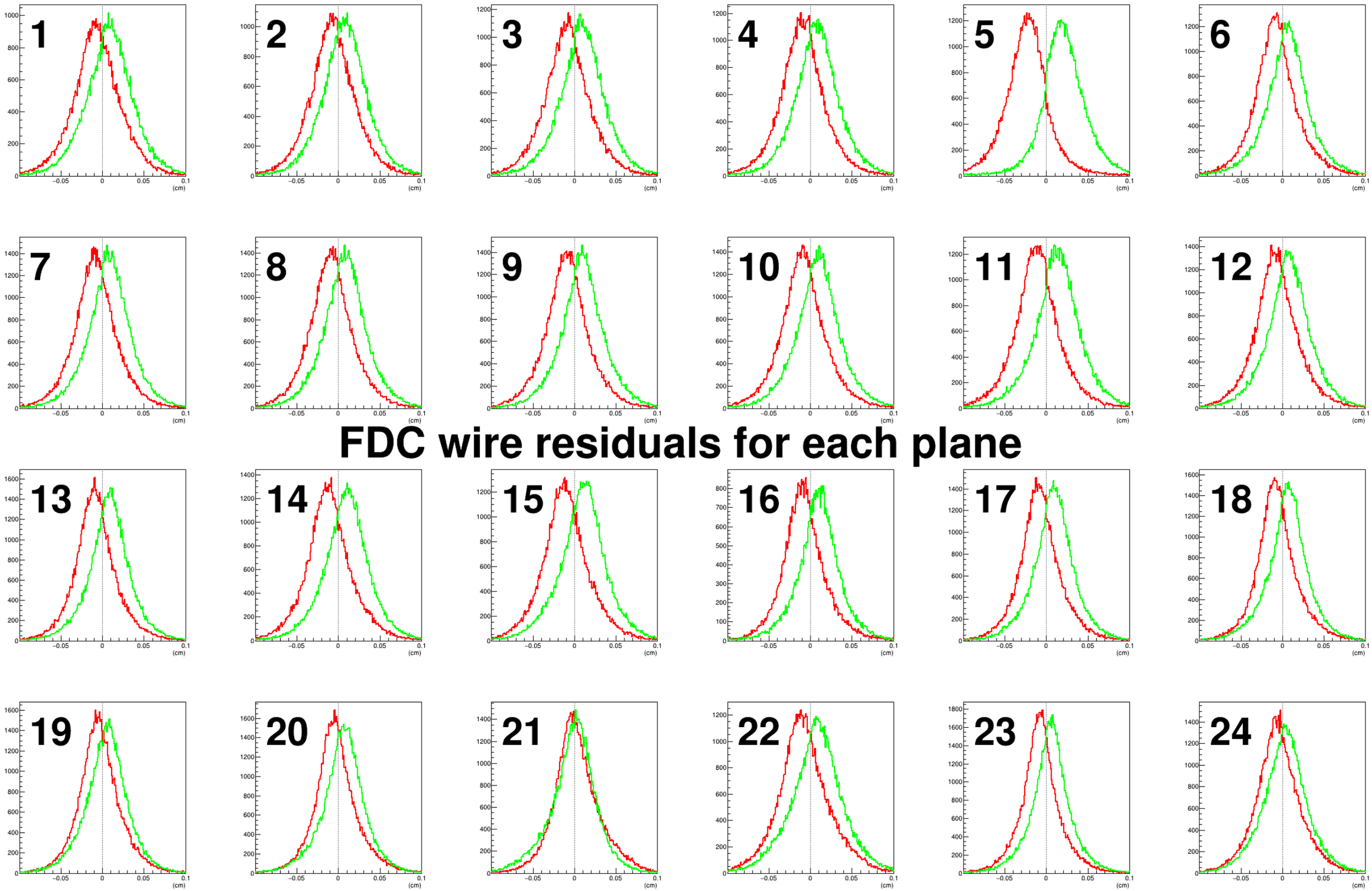
xt-curve calibration for no-field runs



xt-curve .. a function which converts “drift time (t)” into “drift distance (x)”
(= red curve in the above graph)

Run100852, before calibration

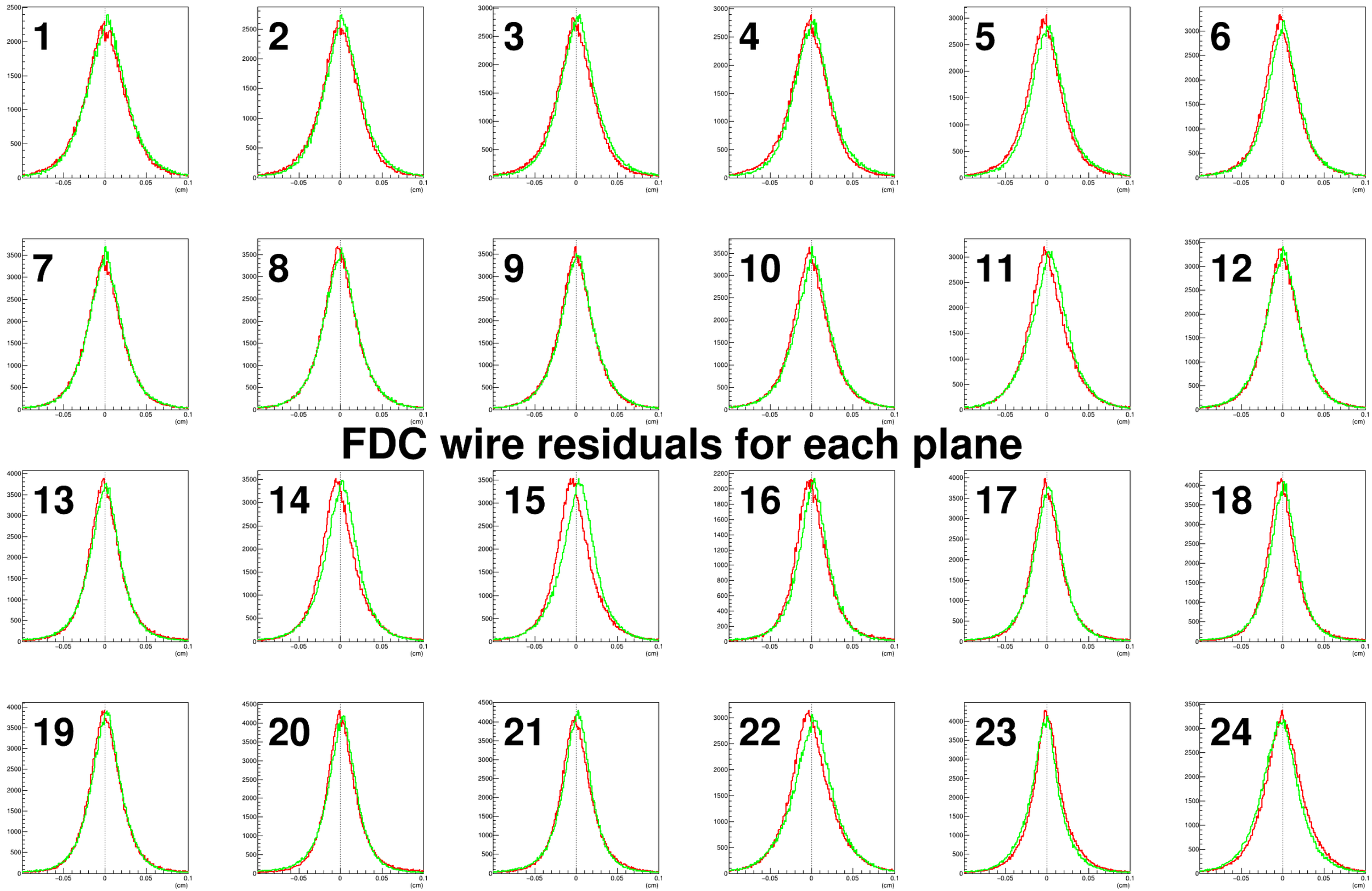
Red: hits on the right side of the wire, Green: left side



FDC wire residuals for each plane

Run100852, after xt, t0 calibration

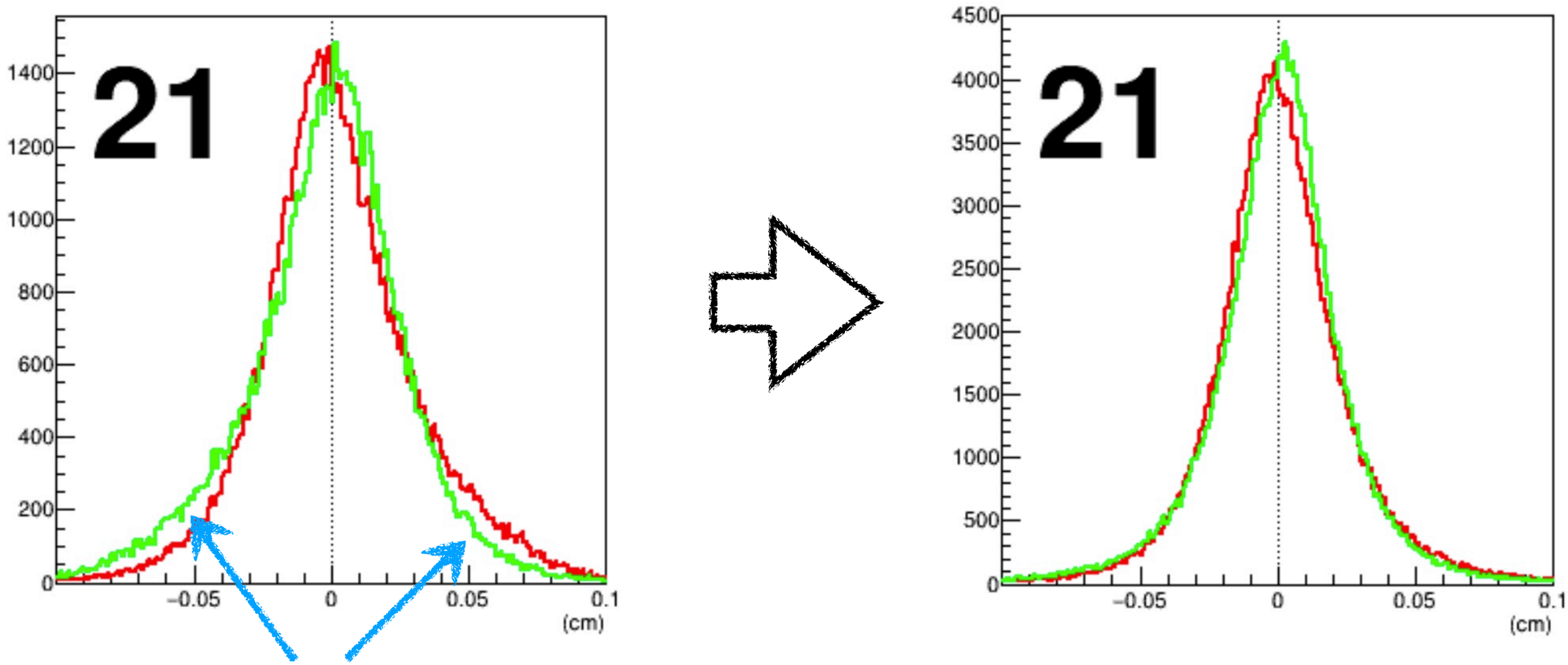
Red: hits on the right side of the wire, Green: left side



FDC wire residuals for each plane

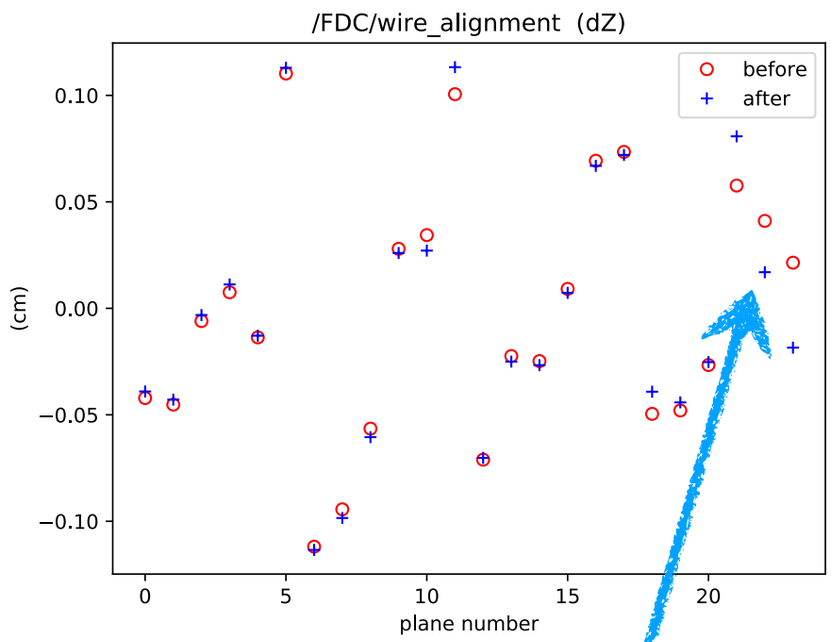
Run100852, after xt, t0 calibration

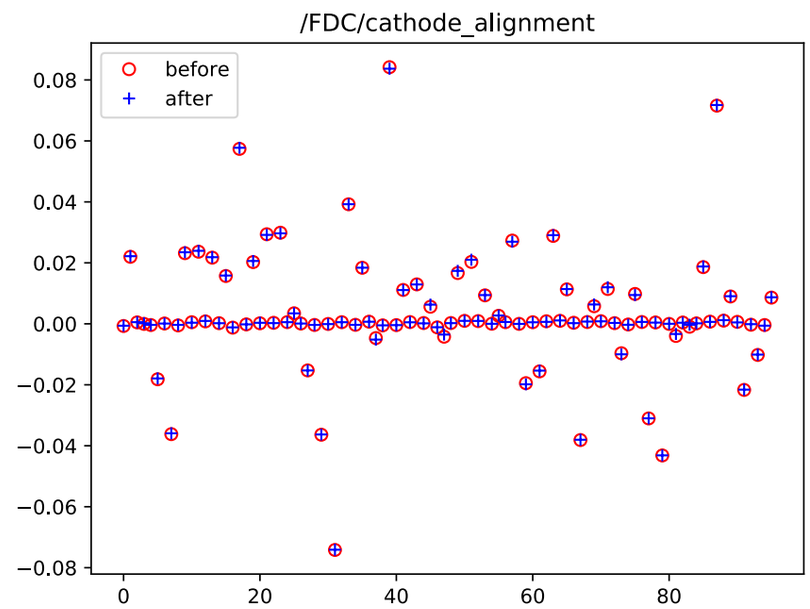
Consistency of Left/Right residuals are mostly coming from t0 calibration.
Slightly asymmetric shape of (L/R) residuals are from incorrect xt-curve.

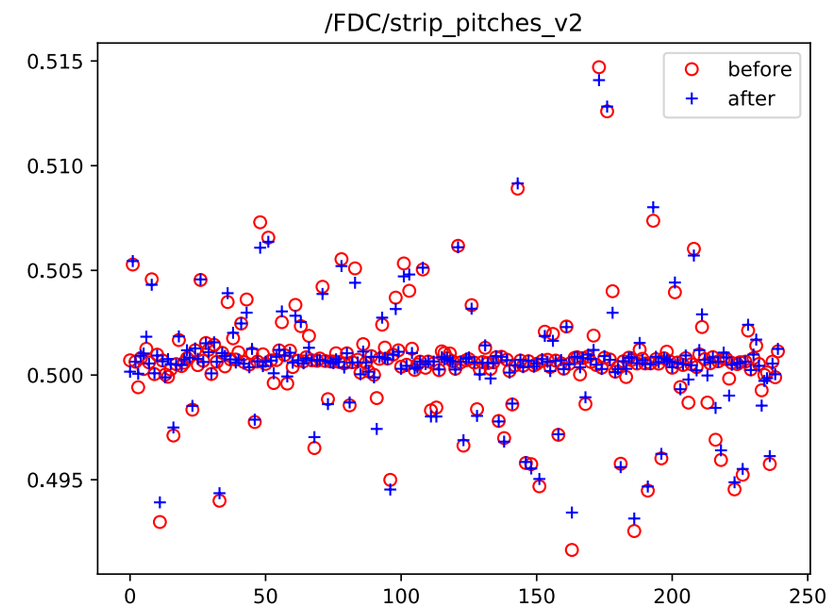


This slight asymmetry vanishes by xt calibration.

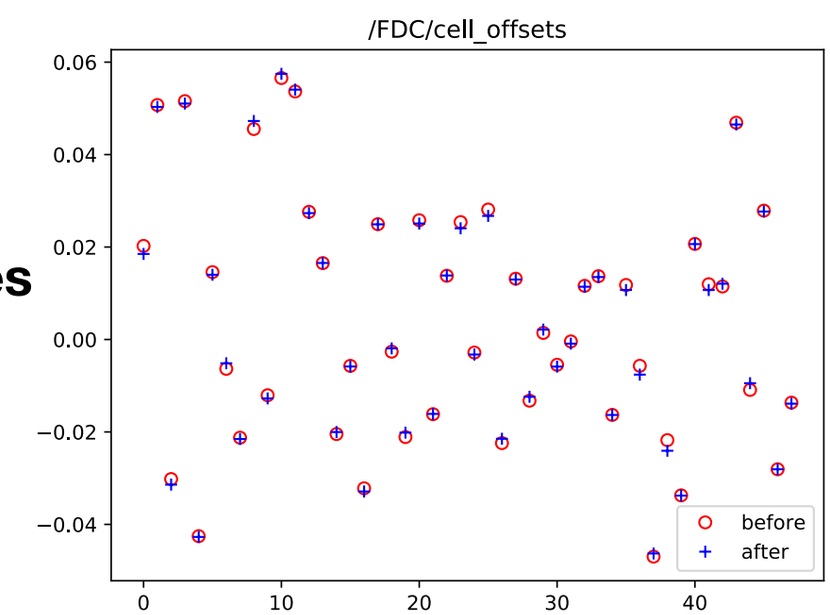
Millepede alignment

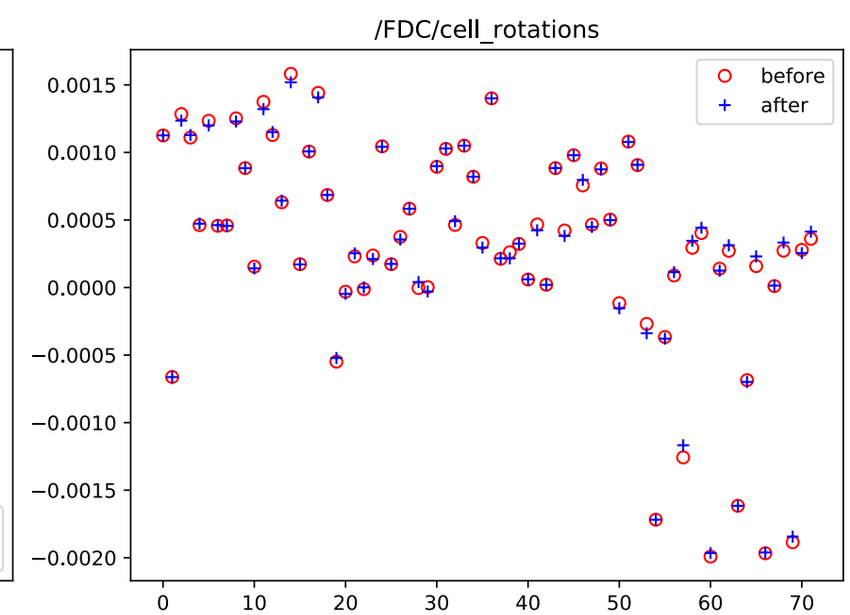






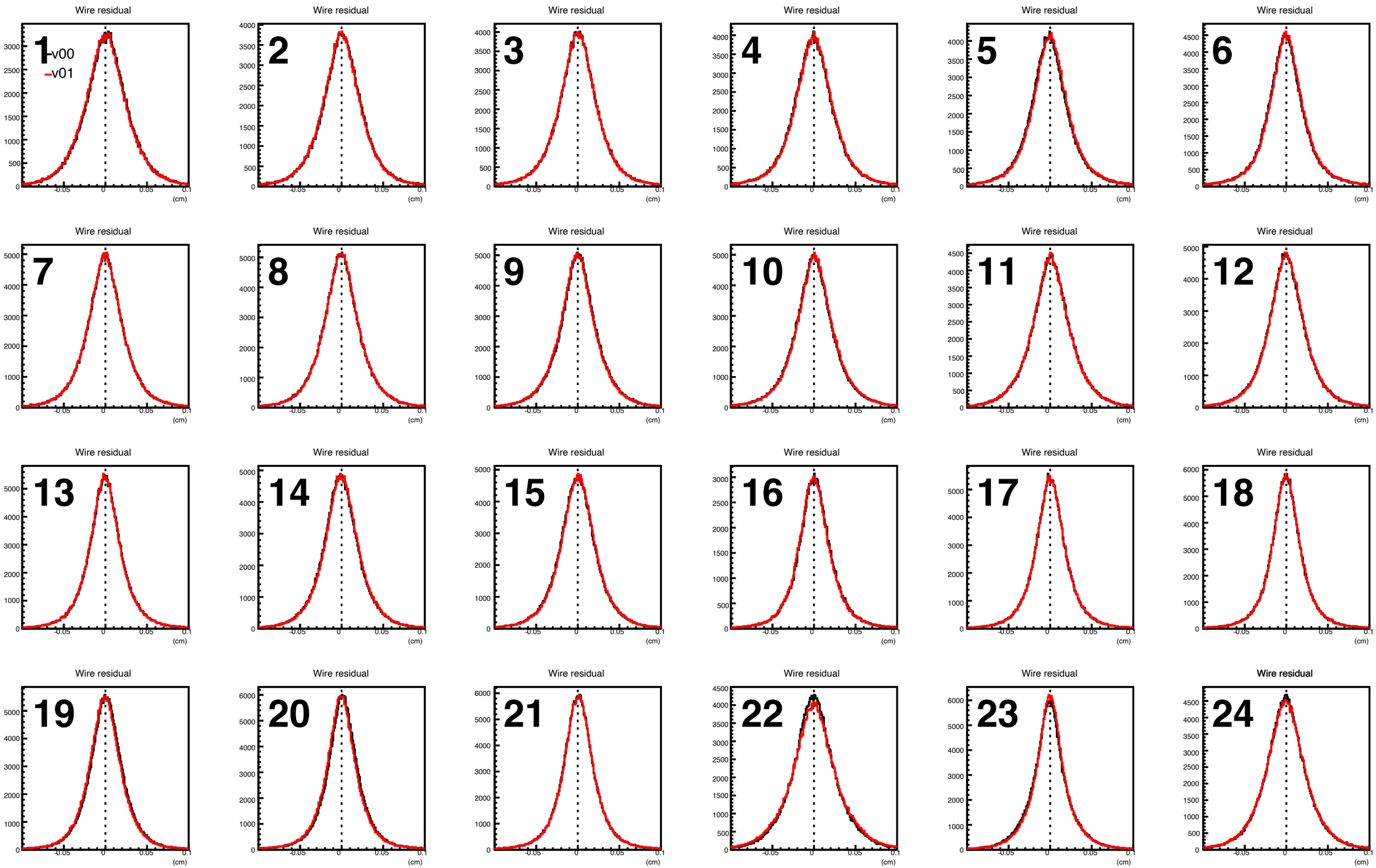
A few mm level shifts for the most downstream planes





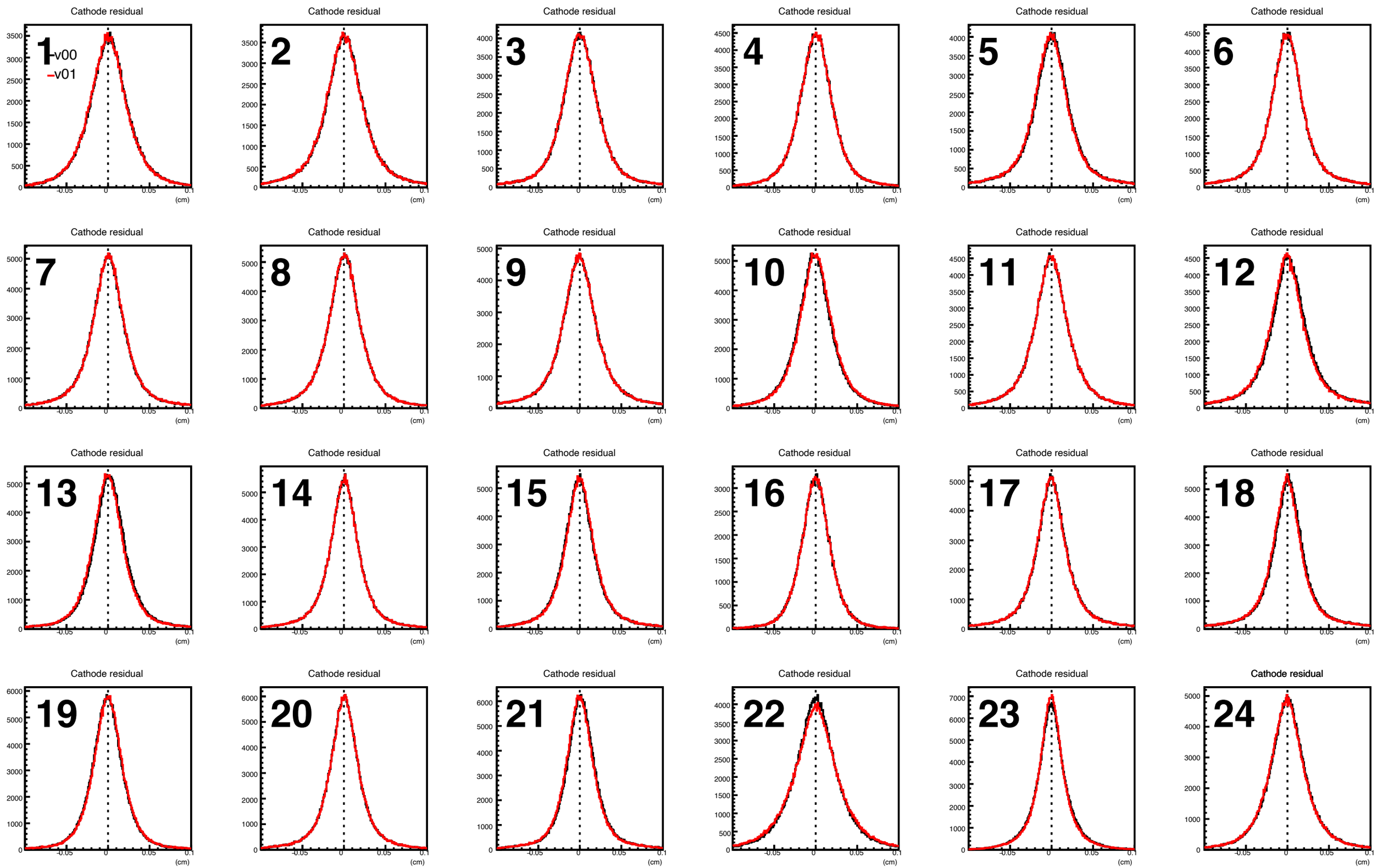
FDC Wire residual

Black: Before alignment, Red: After Millepede alignment



FDC Cathode residual

Black: Before alignment, Red: After Millepede alignment



```
/FDC> cat wire_alignment
```

dPhi	dX	dZ
double	double	double
0.0	0.0	-0.0400637
0.0	0.0	-0.0428245
0.0	0.0	-0.0073865
0.0	0.0	0.0039247
0.0	0.0	-0.0160778
0.0	0.0	0.104701
0.0	0.0	-0.106367
0.0	0.0	-0.0919147
0.0	0.0	-0.0544616
0.0	0.0	0.0245202
0.0	0.0	0.0334215
0.0	0.0	0.0963594
0.0	0.0	-0.0686705
0.0	0.0	-0.0201563
0.0	0.0	-0.0205314
0.0	0.0	0.0095284
0.0	0.0	0.070029
0.0	0.0	0.075638
0.0	0.0	-0.0499542
0.0	0.0	-0.0450697
0.0	0.0	-0.0274397
0.0	0.0	0.0510637
0.0	0.0	0.0445151
0.0	0.0	0.0136495

```
/FDC> cat cathode_alignment
```

dPhiU	dU	dPhiV	dV
double	double	double	double
-0.000833627	0.0224353	0.000568822	0.00043154
-0.000405694	-0.0179492	0	
-0.000648484	0.0231426	0	
0.00052061	0.0216437	-2.	
-0.001208	0.057543	-0.	
0.000113904	0.0298179	0.	
0.000527821	0.00310376	0.	
-0.000410145	-0.0364269	-	
0.000581929	0.0394492	-0	
0.000704595	-0.00418884	-	
-0.000201679	0.0115778	0	
0.000149771	0.00531873	-0	
0.000104165	0.0166032	0.	
0.000898711	0.00937483	3.	
0.00044514	0.0274821	4.6	
0.000509082	-0.0155218	0.	
0.000907864	0.0116276	0.	
0.000343848	0.0055463	0.	
0.000103325	-0.00941138	-	
0.000690179	-0.0310112	0.	
-3.57476e-05	-0.00411825		
0.000254784	0.0183923	0.	
0.00105877	0.00874037	0.0	
-0.000210822	-0.0103296	-	

```
/FDC> cat strip_pitches_v2
```

U_SP_1	U_G_1	U_SP_2	U_G_2	U_SP_3	V_SP_1	V_G_1	V_SP_2	V_G_2	V_SP_3
double	double	double	double	double	double	double	double	double	double
0.500704	0.505342	0.500655	0.499195	0.500497	0.500796	0.501263	0.500644	0.504878	0.50033
0.500556	0.492981	0.500723	0.50038	0.50043	0.500266	0.497112	0.5005	0.501594	0.500389
0.500383	0.501079	0.50089	0.498051	0.501029	0.500381	0.504451	0.500703	0.501475	0.500746
0.500155	0.501597	0.500602	0.493878	0.500737	0.500289	0.503359	0.50075	0.501578	0.500711
0.50067	0.502521	0.500518	0.50374	0.500647	0.500443	0.497653	0.500656	0.507334	0.500327
0.500913	0.50657	0.500706	0.499531	0.500742	0.501231	0.50245	0.500962	0.499388	0.500972
0.500776	0.503173	0.500721	0.502214	0.500805	0.500792	0.502187	0.500723	0.496043	0.500739
0.500717	0.503435	0.500669	0.49916	0.500533	0.500647	0.501079	0.500611	0.505438	0.500649
0.500568	0.497809	0.500687	0.505423	0.500799	0.50044	0.501953	0.500584	0.498333	0.500522
0.500364	0.499798	0.500732	0.502271	0.500835	0.500737	0.495298	0.500994	0.503069	0.501247
0.500346	0.506653	0.500501	0.503437	0.500801	0.500244	0.500411	0.500643	0.505144	0.500477
0.501029	0.498117	0.50049	0.49867	0.500632	0.500967	0.500739	0.50083	0.501166	0.500983
0.500615	0.506311	0.500554	0.495901	0.500522	0.500528	0.503141	0.500587	0.498325	0.500429
0.500498	0.501984	0.500568	0.500589	0.500533	0.500919	0.497701	0.500847	0.49696	0.500686
0.500405	0.498776	0.50049	0.50871	0.500595	0.500528	0.495821	0.500643	0.495541	0.50057
0.500614	0.493675	0.500655	0.502431	0.500728	0.500556	0.501606	0.500664	0.497159	0.500612
0.500378	0.502184	0.500537	0.490425	0.500526	0.500439	0.499922	0.500807	0.498179	0.500549
0.500602	0.500603	0.500413	0.516269	0.500404	0.500755	0.511052	0.500714	0.504885	0.500354
0.500577	0.496133	0.500649	0.500092	0.500937	0.500607	0.491875	0.500553	0.501301	0.500978
0.500445	0.494656	0.500586	0.5071	0.500796	0.500614	0.495696	0.500798	0.501706	0.500692
0.500677	0.503888	0.500546	0.499131	0.500688	0.500674	0.498334	0.500561	0.508762	0.500463
0.500771	0.502476	0.500813	0.498553	0.500693	0.501067	0.496357	0.500659	0.49575	0.50055
0.500579	0.499862	0.500588	0.493932	0.500591	0.50067	0.49502	0.500638	0.502149	0.500402
0.500434	0.500326	0.500525	0.500339	0.500466	0.500718	0.496035	0.500656	0.499488	0.500854

```
/FDC> cat cell_offsets
```

xshift	yshift
double	double
0.020701	0.0498439
-0.029237	0.0511032
-0.0410748	0.0146457
-0.00540043	-0.0211146
0.0451234	-0.0123473
0.0552243	0.0528162
0.0278986	0.0171972
-0.0212299	-0.00560098
-0.033001	0.0244986
-0.0026173	-0.02205
0.0267136	-0.0170567
0.0152574	0.0259455
-0.0018955	0.0282143
-0.022444	0.0130815
-0.0134652	0.00108622
-0.0052049	-0.000567
0.0116953	0.0130787
-0.0162116	0.0122474
-0.0047521	-0.0474222
-0.0208884	-0.0337604
0.0217916	0.0122218
0.0122523	0.0473024
-0.011331	0.0283111
-0.0281272	-0.0134288

```
/FDC> cat cell_rotations
```

dPhiX	dPhiY	dPhiZ
double	double	double
0.00112607	-0.000607902	0.00115752
0.00110482	0.000458803	0.00115554
0.00048647	0.000442227	0.00129037
0.000883925	0.000185006	0.00151434
0.00115164	0.000643886	0.00159353
0.000183637	0.00100018	0.0015181
0.000685096	-0.000487417	-0.000143421
0.000263139	6.72e-06	0.000277945
0.000999845	0.000198933	0.000367487
0.000583421	7.4589e-05	-7.726e-06
0.000905311	0.00103293	0.000307329
0.00105919	0.000814764	0.000417678
0.00140041	0.000241864	0.000441507
0.00038745	9.6934e-05	0.000537944
2.582e-05	0.000881178	0.000490948
0.00097926	0.000794808	0.000476699
0.00089556	0.000510968	8.7186e-05
0.00110153	0.000894051	1.4492e-05
-0.00171822	-0.000320051	6.1824e-05
-0.00127422	0.000283952	0.000279429
-0.00201401	0.000153031	0.000191788
-0.00161564	-0.00062198	-9.2232e-05
-0.00192794	3.34745e-05	0.000230368
-0.00190211	0.000288432	0.000218228