

Status Ξ^0_c analysis, Oct. 11 (2022), CKim

- **New analysis code (*AliAnaTaskSEXicOSL*)**

- **Notable updates**

- a. Tree structure: previous **e-Xi pair** only → **event/electron/cascade** independently
- b. Some cuts' applying position changed (e.g., e+e- min mass > 0.05 during preselection)
- c. **Updated some cuts suspected as a bug** (e.g., cascade decay lengths)
- d. For better consistency and human error reduction,
 - d-1. Moved most of the hard-coded values to the header, if possible
 - d-2. Matched variables' type to the official ALICE library (i.e., uses `Double_t` if the official function returns `Double_t`)
 - d-3. Checked 3 sample AODs for compatibility check (pp data, pp MC, and pA data)
- e. etc: **removed most of the histograms** for now

- **Crosschecks**

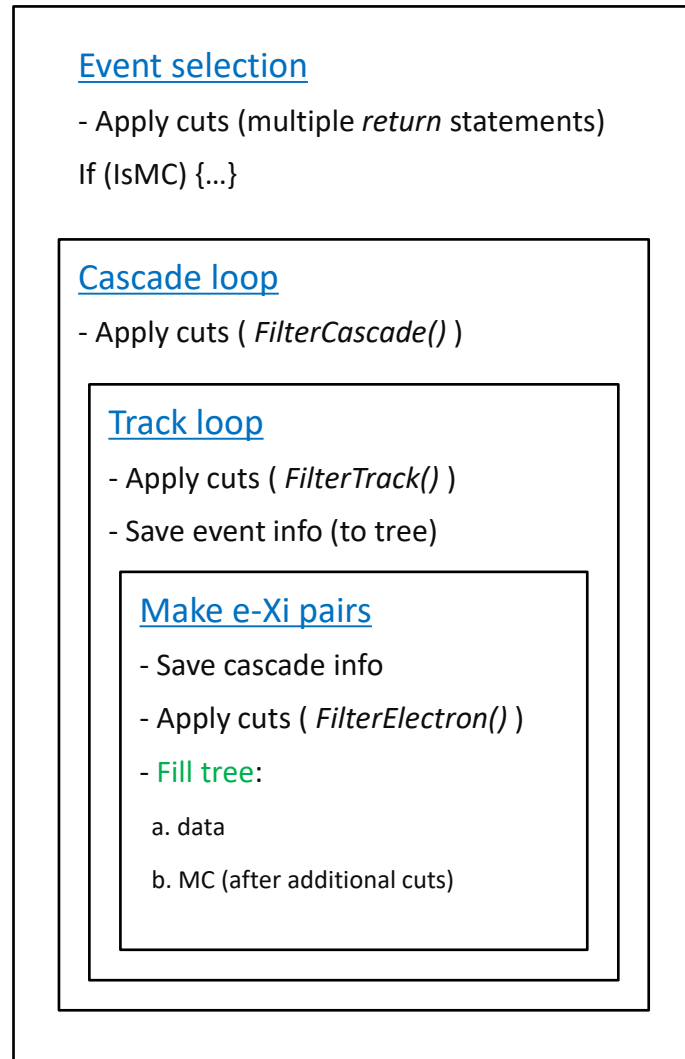
- a. Done: online selection (by events, by reco. cascades, and by reco. tracks)
- b. To do: offline selection (especially e-Xi pairs' yields, mass, pT, etc)

- **To do**

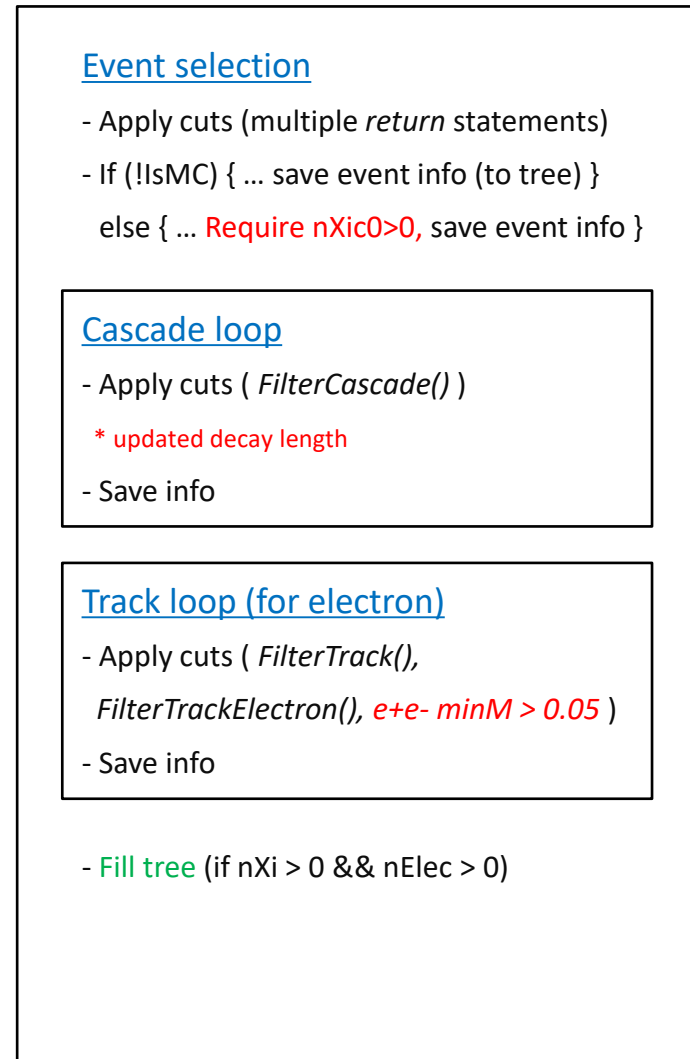
- a. Add missing variables saved in form of histograms in old code (need to check old offline analysis routines)
- b. Add offline analysis routines (e.g., unfolding)

Comparison Structure change for online selection code (AliAnalysisTask...)

Old



New



xCheck Old ↔ New, online selection (1)

• Eventwise selection

- Most of cuts stay the same (function invoking, cut values, etc)
 - Invoking order can be different
 - For MC, **new code saves an event only if nXic0 (true) > 0**
 - Function *CheckOrigin()* updated:
 - Old code checks consequently if origin is 5 (b-quark = b_flag) or NOT
 - New code checks origin more strictly (if 4 (c-quark) or 5) and returns the value**
- xCheck: exactly match if above item “b” is off

```

[screen 0: ckim@kiaiui-0un_tmux] kiaiui ckim_SYSTEM_TMUX 1 kiaiui: kiaiui~/work/Xic0New/Log/Log_xCheck_2022Sep10m_log_xCheckNew_0927_event --
4 -2.9238
*** DatabasePDG::AddParticle: particle with PDGcode=3124 already defined
*** DatabasePDG::AddAntiParticle: can't redefine parameters
6 -2.8952
31 6.9671
32 6.4424
36 -4.2863
39 -0.5380
46 -0.5151
50 -0.6913
59 -0.3086
61 -3.0911
62 -4.4114
72 7.8572
82 -1.0290
83 1.7412
84 9.1360
86 5.1097
88 -3.7774
90 -7.0946
99 -1.9555
114 -5.8436
118 -3.7138
124 8.0242
126 -2.0502
134 -1.0733
137 1.8161
140 1.8936
148 -4.4343
149 -2.1804
151 5.9148
152 2.6811
156 -1.5086
157 4.2969
158 -3.0224
159 2.8929
169 -4.5840
175 6.0923
176 -4.5158
178 0.7972
179 -6.8668
185 4.9141
191 4.2886
195 1.8909
198 -0.8074
204 3.8927
208 4.5497
221 -4.2593
228 -6.0452
238 0.0821
239 -0.5885
241 1.8702
249 3.8815
259 3.4814
262 2.8814
~/log_xCheckOld_0927_event_data.txt 342,6 9% log_xCheckNew_0927_event_data.txt 339,4 9%

```

```

[screen 0: ckim@kiaiui-0un_tmux] kiaiui ckim_SYSTEM_TMUX 1 kiaiui: kiaiui~/work/Xic0New/Log/Log_xCheck_2022Sep10m_log_xCheckNew_0927_event --
1 -1.0584
*** DatabasePDG::AddParticle: particle with PDGcode=3124 already defined
2 0.2781
*** DatabasePDG::AddAntiParticle: can't redefine parameters
3 -1.9232
4 2.0301
5 -3.7953
6 -1.5421
7 1.3168
8 -2.9992
9 -0.0774
10 -0.6204
11 -8.5469
12 -5.6111
13 2.0651
14 -1.5124
15 -5.9465
16 -5.5683
17 1.7289
18 1.1950
19 2.1142
20 4.4942
21 -1.5064
22 -8.8808
23 1.5859
24 0.5972
25 -3.8463
26 -1.4247
27 -6.4934
28 2.6805
29 1.1491
30 -2.3583
31 -1.1255
32 -6.4533
33 7.2565
34 4.9084
35 -0.9640
36 -0.3137
37 -4.6333
38 5.0535
39 -1.0583
40 -2.0859
42 5.7670
43 2.3189
44 2.3541
45 0.3120
46 -1.3557
48 3.6868
49 0.3158
50 -1.7507
51 -8.5235
52 7.8166
53 -2.0189
54 -2.2259
55 2.8814
~/log_xCheckOld_0927_event_mc.txt 321,13 3% log_xCheckNew_0927_event_mc.txt 294,13 3%

```

xCheck Old ↔ New, online selection (2)

• Track selection

- Most of cuts stay the same (function invoking, cut values, etc)
 - a. Invoking order can be different
 - b. Applied **e+e- pair (unlike-signed tracks) min mass > 0.05 cut during online selection** (old code applied it offline)
- **xCheck: right after *FilterTrack()* and *FilterElectron()* applied, before min mass cut:**
 - a. Data: exact match
 - b. **MC: results are slightly different** - it seems the function *AliPIDResponse::NumberOfSigmasTOF<TPC>* newly evaluated for every execution? Even the same code (either Old or New) shows different results

```

xCheck [Old] [New]
*** Database00::AddParticle: particle with PDGcode=3324 already defined
*** Database00::AddParticle: can't redefine parameters
126 26 183 1 4091
286 50 26 0 5548
416 15 7 1 5281
589 481 8 0 5217
733 3 1 0 6243
803 1 0 0 5063
866 141 129 1 9371
928 286 49 0 5548
1000 5 1 0 9009
1360 315 17 0 5419
1400 3 1 1 5270
1714 53 34 0 5885
2426 4 0 0 5223
2589 1 1 0 8237
2762 62 21 0 5522
2797 334 21 0 7173
2884 375 0 0 6100
3026 370 45 0 8661
3320 3 0 1 7644
3450 23 25 0 6664
3437 195 4 0 8015
3760 3 2 1 0503
3923 349 50 0 5575
3970 22 27 0 6033
4236 78 181 1 3890
4300 7 47 1 4228
4359 57 0 0 8350
4403 31 4 1 2357
4440 100 44 0 7910
4457 139 356 1 5088
4456 250 320 1 7747
4734 31 30 0 9563
5377 40 40 0 9000
5450 222 181 1 3110
6130 15 19 1 4862
6150 230 31 0 5033
6286 615 70 0 8323
7085 46 22 2 7903
7730 187 1 1 4274
778 12 20 0 5700
7786 132 4 0 7642
798 30 41 0 7512
8071 16 6 1 0890
8071 218 7 1 9749
8094 104 12 0 8193
8184 19 19 0 6016
8336 250 172 1 5247
8394 23 7 1 3301
8371 0 1 1 0447
8394 370 6 1 5829
log_xCheckOld_0928_tracks_data.txt 349,1
*** Database00::AddParticle: particle with PDGcode=3324 already defined
*** Database00::AddParticle: can't redefine parameters
126 26 183 1 4091
286 50 26 0 5548
416 15 7 1 5281
589 481 8 0 5217
733 3 1 0 6243
803 1 0 0 5063
866 141 129 1 9371
928 286 49 0 5548
1000 5 1 0 9009
1360 315 17 0 5419
1400 3 1 1 5270
1714 53 34 0 5885
2426 4 0 0 5223
2589 1 1 0 8237
2762 62 21 0 5522
2797 334 21 0 7173
2884 375 0 0 6100
3026 370 45 0 8661
3320 3 0 1 7644
3450 23 25 0 6664
3437 195 4 0 8015
3760 3 2 1 0503
3923 349 50 0 5575
3970 22 27 0 6033
4236 78 181 1 3890
4300 7 47 1 4228
4359 57 0 0 8350
4403 31 4 1 2357
4440 100 44 0 7910
4457 139 356 1 5088
4456 250 320 1 7747
4734 31 30 0 9563
5377 40 40 0 9000
5450 222 181 1 3110
6130 15 19 1 4862
6150 230 31 0 5033
6286 615 70 0 8323
7085 46 22 2 7903
7730 187 1 1 4274
778 12 20 0 5700
7786 132 4 0 7642
798 30 41 0 7512
8071 16 6 1 0890
8071 218 7 1 9749
8094 104 12 0 8193
8184 19 19 0 6016
8336 250 172 1 5247
8394 23 7 1 3301
8371 0 1 1 0447
8394 370 6 1 5829
log_xCheckNew_0928_tracks_data.txt 350,21

```


Backup xCheck: eventwise selection, data, pp

```

[screen 0: ckim@kiaf-ui:~(run_tmux)] kiaf-ui 썩 ckim_SYSTEM_TMUX 썩 1: ckim@kiaf-ui:~/work/Xic0New/Logs/logs_xCheck_2022Sep(vim log_xCheckNew_0927_event
 4 -2.9238
*** TDatabasePDG::AddParticle: particle with PDGcode=3124 already defined
*** TDatabasePDG::AddAntiParticle: can't redefine parameters
 6 -2.8052
 31 6.9671
 32 8.4434
 36 -4.2863
 39 -0.5380
 46 -0.5151
 50 -0.6913
 59 -0.3006
 61 -3.0911
 62 -4.4114
 73 7.8572
 82 -1.0290
 83 1.7412
 84 9.1960
 86 5.1097
 88 -3.7774
 90 -7.9946
 99 -1.9555
114 -5.8436
118 -3.7138
124 8.0242
126 -2.0502
134 -1.0733
137 1.8161
140 1.8936
148 -4.4343
149 -2.1984
151 -5.9148
152 2.6011
156 -1.5006
157 4.2969
158 -3.0224
159 2.8929
169 -4.5840
175 6.6923
176 -4.5158
178 0.7972
179 -6.8668
185 4.9141
191 4.2986
195 1.0499
198 -0.0074
204 3.8027
208 4.5497
221 -4.2593
228 -6.0452
238 0.0821
239 -0.5085
241 1.8762
249 3.0815
250 3.4614
./log_xCheck01d_0927_event_data.txt 342,6 9%

 4 -2.9238
*** TDatabasePDG::AddParticle: particle with PDGcode=3124 already defined
*** TDatabasePDG::AddAntiParticle: can't redefine parameters
 6 -2.8052
 31 6.9671
 32 8.4434
 36 -4.2863
 39 -0.5380
 46 -0.5151
 50 -0.6913
 59 -0.3006
 61 -3.0911
 62 -4.4114
 73 7.8572
 82 -1.0290
 83 1.7412
 84 9.1960
 86 5.1097
 88 -3.7774
 90 -7.9946
 99 -1.9555
114 -5.8436
118 -3.7138
124 8.0242
126 -2.0502
134 -1.0733
137 1.8161
140 1.8936
148 -4.4343
149 -2.1984
151 -5.9148
152 2.6011
156 -1.5006
157 4.2969
158 -3.0224
159 2.8929
169 -4.5840
175 6.6923
176 -4.5158
178 0.7972
179 -6.8668
185 4.9141
191 4.2986
195 1.0499
198 -0.0074
204 3.8027
208 4.5497
221 -4.2593
228 -6.0452
238 0.0821
239 -0.5085
241 1.8762
249 3.0815
250 3.4614
log_xCheckNew_0927_event_data.txt 339,4 9%

c ckim kiaf-ui 1 | ~/work/Xic0New/Logs/logs_xCheck_2022Sep(vim log_xCheckNew_0927_event_data.txt)* 14:18 04-Oct

```

Backup xCheck: eventwise selection, mc, pp

```

[screen 0: ckim@kiaf-ui:~(run_tmux)] kiaf-ui 썩 ckim_SYSTEM_TMUX 썩 1: ckim@kiaf-ui:~/work/Xic0New/Logs/logs_xCheck_2022Sep(vim log_xCheckNew_0927_event
1 -1.0584
*** TDatabasePDG::AddParticle: particle with PDGcode=3124 already defined
*** TDatabasePDG::AddAntiParticle: can't redefine parameters
2 0.2781
3 -1.9232
4 2.8301
5 -3.7953
6 -1.5421
7 1.3168
8 -2.9992
9 -8.6774
10 -0.6204
11 -8.5469
12 -1.6112
13 2.0651
14 -1.5124
15 -5.9465
16 -5.5603
17 1.7305
18 1.1950
19 2.1142
20 4.4942
21 -1.5064
22 -8.8808
23 -1.5859
24 0.5972
25 -3.8463
26 -1.4287
27 -6.4934
28 2.6085
29 1.1491
30 -2.3583
31 -1.1255
32 -6.4533
33 7.2565
34 4.9804
35 -0.9640
36 -0.3137
37 -4.6333
38 5.0535
39 -1.0502
40 -2.0859
42 5.7670
43 2.3189
44 2.3541
45 6.3320
46 -1.3557
48 3.6860
49 9.3158
50 -1.7507
51 -8.5235
52 7.8166
53 -2.0189
54 -3.2259

1 -1.0584
2 0.2781
3 -1.9232
*** TDatabasePDG::AddParticle: particle with PDGcode=3124 already defined
*** TDatabasePDG::AddAntiParticle: can't redefine parameters
4 2.8301
5 -3.7953
6 -1.5421
7 1.3168
8 -2.9992
9 -8.6774
10 -0.6204
11 -8.5469
12 -1.6112
13 2.0651
14 -1.5124
15 -5.9465
16 -5.5603
17 1.7305
18 1.1950
19 2.1142
20 4.4942
21 -1.5064
22 -8.8808
23 -1.5859
24 0.5972
25 -3.8463
26 -1.4287
27 -6.4934
28 2.6085
29 1.1491
30 -2.3583
31 -1.1255
32 -6.4533
33 7.2565
34 4.9804
35 -0.9640
36 -0.3137
37 -4.6333
38 5.0535
39 -1.0502
40 -2.0859
42 5.7670
43 2.3189
44 2.3541
45 6.3320
46 -1.3557
48 3.6860
49 9.3158
50 -1.7507
51 -8.5235
52 7.8166
53 -2.0189
54 -3.2259

./log_xCheck01d_0927_event_mc.txt 321,13 3% log_xCheckNew_0927_event_mc.txt 294,13 3%
c ckim kiaf-ui 1 | ~/work/Xic0New/Logs/logs_xCheck_2022Sep(vim log_xCheckNew_0927_event_mc.txt)* 14:22 04-Oct

```

Backup xCheck: track selection, data, pp

```

[screen 0: ckim@kiaf-ui:~(run_tmux)] kiaf-ui 썩 ckim_SYSTEM_TMUX 썩 1: ckim@kiaf-ui:~/work/Xic0New/Logs/logs_xCheck_2022Sep(vim log_xCheckNew_0928_track - □ ×
E-AlliOADBContainer::GetObject: Default Object (TimeRangeMasking) not found | E-AlliOADBContainer::GetObject: Default Object (TimeRangeMasking) not found
! | !
*** TDatabasePDG::AddParticle: particle with PDGcode=3124 already defined | *** TDatabasePDG::AddParticle: particle with PDGcode=3124 already defined
*** TDatabasePDG::AddAntiParticle: can't redefine parameters | *** TDatabasePDG::AddAntiParticle: can't redefine parameters
176 244 185 1.4891 | 176 244 185 1.4891
286 39 26 0.5548 | 286 39 26 0.5548
416 15 7 1.5281 | 416 15 7 1.5281
589 481 9 0.5177 | 589 481 9 0.5177
733 3 1 0.6243 | 733 3 1 0.6243
803 1 9 0.5061 | 803 1 9 0.5061
866 141 329 1.9371 | 866 141 329 1.9371
924 286 47 0.5568 | 924 286 47 0.5568
1060 5 1 0.9009 | 1060 5 1 0.9009
1164 315 17 0.5419 | 1164 315 17 0.5419
1440 3 3 1.5270 | 1440 3 3 1.5270
1714 53 34 0.5885 | 1714 53 34 0.5885
2476 8 4 0.6123 | 2476 8 4 0.6123
2589 1 1 0.8237 | 2589 1 1 0.8237
2762 62 72 0.5572 | 2762 62 72 0.5572
2797 334 21 0.7173 | 2797 334 21 0.7173
2864 375 6 0.6168 | 2864 375 6 0.6168
3026 370 45 0.8661 | 3026 370 45 0.8661
3328 3 0 1.7648 | 3328 3 0 1.7648
3434 23 25 0.6664 | 3434 23 25 0.6664
3437 195 4 0.8015 | 3437 195 4 0.8015
3748 3 2 1.0583 | 3748 3 2 1.0583
3923 349 50 0.5175 | 3923 349 50 0.5175
3970 22 37 0.6633 | 3970 22 37 0.6633
4236 78 301 1.3890 | 4236 78 301 1.3890
4369 7 67 1.4228 | 4369 7 67 1.4228
4379 57 43 0.8350 | 4379 57 43 0.8350
4403 11 4 1.2157 | 4403 11 4 1.2157
4448 190 34 0.7910 | 4448 190 34 0.7910
4457 139 356 1.5088 | 4457 139 356 1.5088
4476 258 329 1.7747 | 4476 258 329 1.7747
4734 31 10 0.9563 | 4734 31 10 0.9563
5377 40 34 0.9880 | 5377 40 34 0.9880
5459 222 181 1.3110 | 5459 222 181 1.3110
6130 15 19 1.4162 | 6130 15 19 1.4162
6191 230 31 0.5033 | 6191 230 31 0.5033
6296 615 78 0.8323 | 6296 615 78 0.8323
7005 46 22 2.7993 | 7005 46 22 2.7993
7730 187 1 1.4274 | 7730 187 1 1.4274
7785 12 26 0.5709 | 7785 12 26 0.5709
7786 132 4 0.7682 | 7786 132 4 0.7682
7904 38 41 0.7512 | 7904 38 41 0.7512
8071 16 6 1.9889 | 8071 16 6 1.9889
8071 218 7 1.9749 | 8071 218 7 1.9749
8094 194 12 0.8191 | 8094 194 12 0.8191
8144 19 19 0.6016 | 8144 19 19 0.6016
8336 250 172 1.5247 | 8336 250 172 1.5247
8364 23 7 1.3301 | 8364 23 7 1.3301
8371 9 3 1.0447 | 8371 9 3 1.0447
8394 379 6 1.5829 | 8394 379 6 1.5829
log_xCheck01d_0928_track_data.txt | 349,1 | 48% | log_xCheckNew_0928_track_data.txt | 390,21 | 47%
c ckim kiaf-ui | 1 | ~/work/Xic0New/Logs/logs_xCheck_2022Sep(vim log_xCheckNew_0928_track_data.txt)* | 14:34 04-Oct

```


Backup xCheck: cascade selection, data, pp (Sep. 29)

```

[screen 0: ckim@kiaf-ui:~(run_tmux)] kiaf-ui 썩 ckim_SYSTEM_TMUX 썩 1: ckim@kiaf-ui:~/work/Xic0New/Logs/logs_xCheck_2022Sep(vim log_xCheckNew_0929_track
W-AlliOADBContainer::GetIndexForRun: No object (TimeRangeMasking) found for run 294200 !
W-AlliOADBContainer::GetIndexForRun: No object (TimeRangeMasking) found for run 294200 !

<message repeated 1 time>
E-AlliOADBContainer::GetObject: Default Object (TimeRangeMasking) not found !
E-AlliOADBContainer::GetObject: Default Object (TimeRangeMasking) not found !

*** TDatabasePDG::AddParticle: particle with PDGcode=3124 already defined
*** TDatabasePDG::AddAntiParticle: can't redefine parameters
*** TDatabasePDG::AddParticle: particle with PDGcode=3124 already defined
*** TDatabasePDG::AddAntiParticle: can't redefine parameters
82 0 / 1 1 1 -1
118 0 / 1 1 1 -1
239 0 / -1 -1 1 -1
302 1 / -1 -1 1 -1
312 3 / 1 1 1 -1
409 2 / 1 1 1 -1
524 0 / 1 1 1 -1
615 0 / -1 -1 1 -1
924 1 / -1 -1 1 -1
941 2 / 1 1 1 -1
1110 2 / 1 1 1 -1
1332 1 / -1 -1 1 -1
1359 0 / -1 -1 1 -1
1513 0 / -1 -1 1 -1
1624 0 / -1 -1 1 -1
1661 1 / 1 1 1 -1
1829 0 / -1 -1 1 -1
1916 1 / -1 -1 1 -1
2242 0 / -1 -1 1 -1
2365 0 / -1 -1 1 -1
2436 1 / -1 -1 1 -1
2485 0 / 1 1 1 -1
2511 0 / -1 -1 1 -1
2786 0 / -1 -1 1 -1
2951 0 / -1 -1 1 -1
3086 0 / -1 -1 1 -1
3669 2 / -1 -1 1 -1
3828 0 / -1 -1 1 -1
4171 1 / 1 1 1 -1
4184 0 / 1 1 1 -1
4318 0 / -1 -1 1 -1
4431 0 / -1 -1 1 -1
4513 0 / -1 -1 1 -1
4584 1 / -1 -1 1 -1
4584 3 / 1 1 1 -1
4949 0 / -1 -1 1 -1
5073 0 / -1 -1 1 -1
5242 0 / -1 -1 1 -1
5718 1 / -1 -1 1 -1
5718 2 / -1 -1 1 -1
5719 0 / 1 1 1 -1
5732 1 / 1 1 1 -1
6048 0 / -1 -1 1 -1
6296 2 / 1 1 1 -1
6314 1 / -1 -1 1 -1
6374 3 / 1 1 1 -1
./log_xCheck01d_0929_trackXi_data.txt 389,23
./log_xCheckNew_0929_trackXi_data_matchToOld.txt 386,23

```

