

# Short progress report on Decay Search

20-7-2002

# Decay Search

- **Goal** : To be able to recognize kinks in the new 73 released events.
- **Method** : Bruce's Code with some minor changes
- **Procedure** :
  - First test the code finding efficiency for Large Long and Short decays on Monte Carlo events (which might not represent data very well.).
  - Re-test the code on all the old Phase I kink set ( in progress)
  - Process the cat 2 new events (events which have more than 2 primary tracks) ( have processed 20 / 35 events so far)

# Test on Phase I kinks

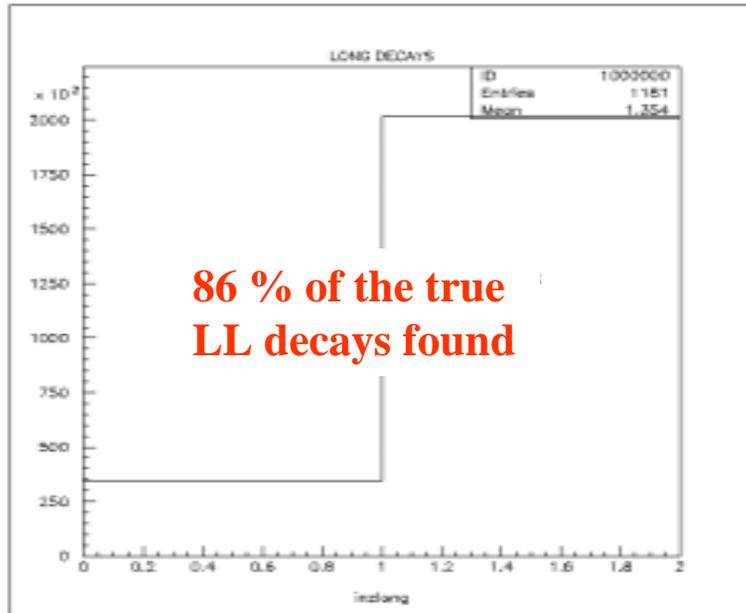
- **Available Information on Phase I kinks:**
  - Byron’s and Gina’s list with 58 kinks and all the information accompanying them apart from “parent” and “daughter”
  - Output kink list from the decay search code on the previous events (58 kinks)
  - Kodama’s and Jikou’s list with 39 kinks with the information on parent and daughter .

# Results on the Test of Phase I kinks

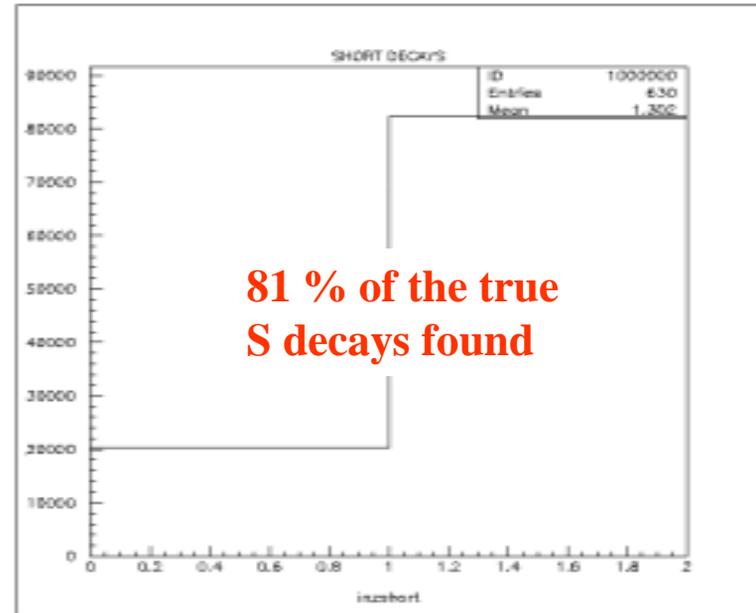
- Found all kinks in Kodama and Jikou list apart from those where :
  - The parent did not exist in any of the available daft m-files
  - The parent and the daughter existed in different daft m-files
- Even without the parent - daughter info I was able to recognize 13 kinks from Byron-Gina list. For 10 events the requested files did not exist . For the rest of the kinks it is difficult to tell since I don't have the parent-daughter info.

# Decay Search : Monte Carlo events

Large Long



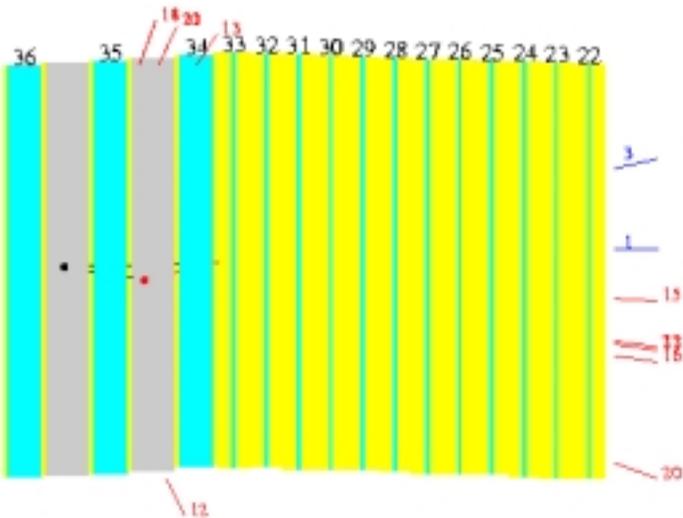
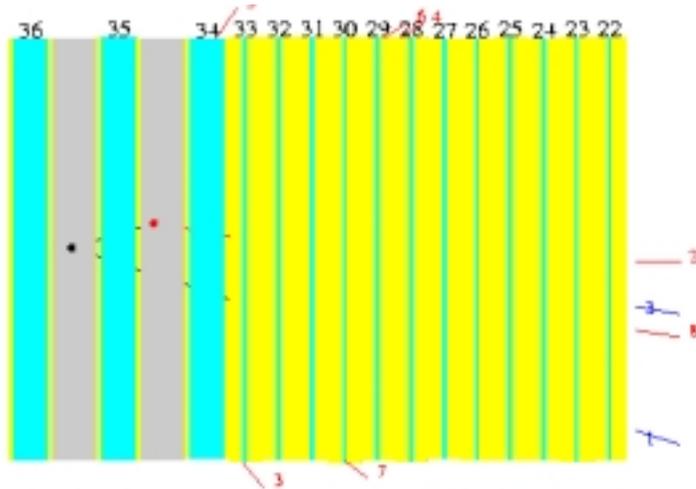
Short



- The finding efficiency for LL (86%) and S(81%) decays on Monte Carlo events is quite satisfactory and gives us confidence on the code performance.
- Next we present the two most interesting of the new cat 2 events while still working with the others.

# Decay Search : 3181\_13626

## scenario #1



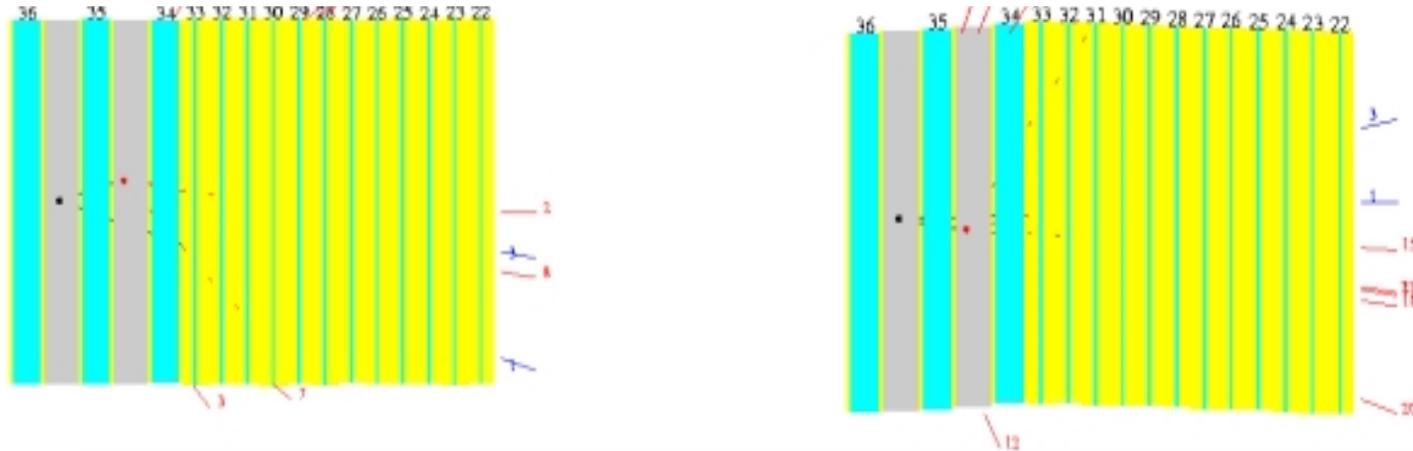
● ≡ Secondary vertex

- Parent: two segment long and daughter: two segment long.
- Daughter matching with Spectrometer SF track.
- IP parent-daughter 3.5 microns.
- Daughter angle 169 mrad.
- Parent flight 1872 microns.



# Decay Search : 3181\_13626 cont.

## scenario #2



- When trying to add more tracks to the secondary vertex the code selected two additional tracks. (??)

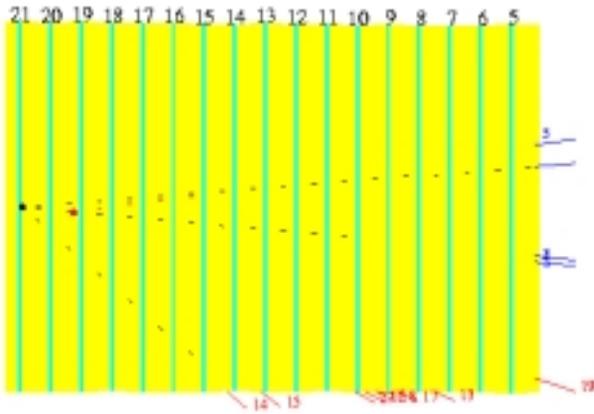
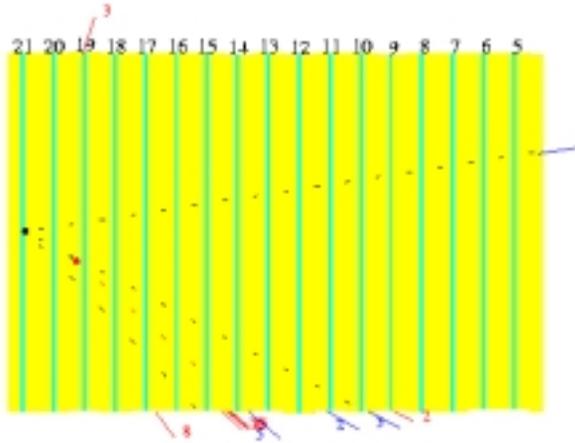
Secondary vertex @ -29504.63 -118067.73 603091.31 plt= 341

Dist from prim 148.84 -70.78 1862.35 micron

trk	nseg	IP micron	vtx chi	spect nht	trk chis	trk mom	dthet U	dthet V	thet U	thet V
3-3411002697	2	11.88	0.03	7	0.6	0.0	0.004	-0.010	-0.048	0.063
4-3411003134	4	4.40	0.00	0	0.0	0.0	0.000	0.000	-0.286	0.402
5-3411002696	3	4.40	0.00	0	0.0	0.0	0.000	0.000	-0.041	-0.020

# Decay Search : 3186\_06199

## scenario #1

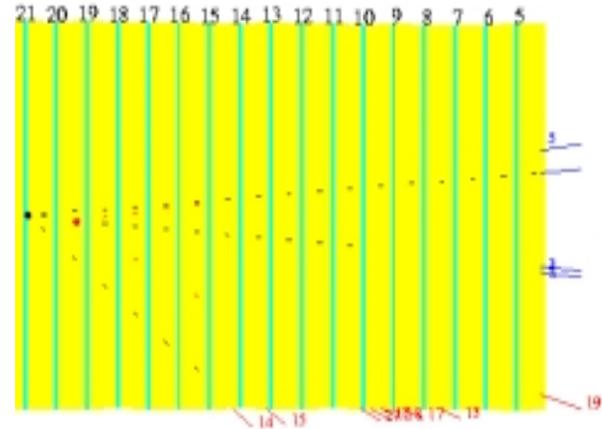
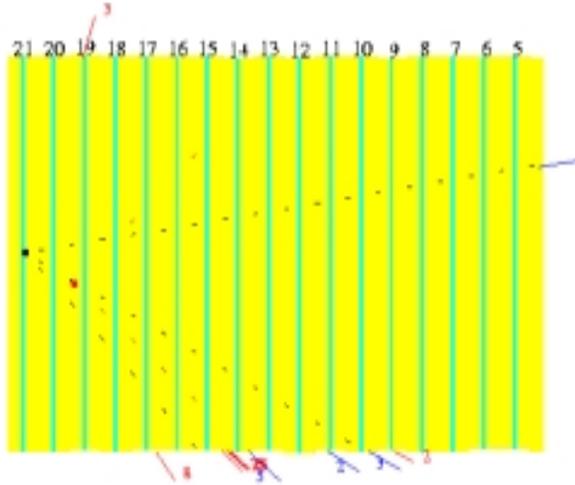


- ≡ Secondary vertex
- Parent: one segment long and daughter: four segment long
- Daughter matching with Spectrometer SF track.
- IP parent-daughter 0.2 microns.
- Daughter angle 106 mrad.
- Parent flight 1267 microns
- However could it be that tracks 201-1006375 (“parent”) and 191-1006869 the same track that for some reason is not recorded as such in the m-file?



# Decay Search : 3186\_06199 cont.

## scenario #2



- When trying to add more tracks to the secondary vertex the code selected one additional two segment track (??)

Secondary vertex @ -252152.62 -85710.56 615416.12 plt= 181

Dist from prim -211.45 -41.19 1192.27 micron

trk	nseg	IP micron	vtx chi	spect nht	trk chis	trk mom	dthet U	dthet V	thet U	thet V
5-1811007519	4	3.00	0.24	7	3.9	0.0	-0.008	-0.004	-0.265	0.042
6-1711005195	2	1.93	0.11	0	0.0	0.0	0.000	0.000	0.297	-0.169

# Summary

- From the results on the 39 Phase I kinks reported by Kodama and Jikou and on the Monte Carlo events the decay search code does not seem to miss any kink candidates.
- However it would be nice if we could test all 58 Phase I kinks. For this the information on parent and daughter is needed.
- In Phase I the decay m-files were produced by running two versions of ecfsal: 2.3 (loose linking) and 3.2 (tight linking). For the new released events however one decay m-file exists. With what version of the linking code is this file created? Is there going to be a second file for these events as well?