Last week's updates
October 9, 2007
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Status

- Francesco came on Wed -> fixed bugs
- Ftksim works with rawhits (expt. hitwarrior)
- Majority logic updated in ftksim & corrgen
- Major code cleanup (revert or leave?)
  - A lot of CDF-related code -> hard to follow
  - This code had useful ideas (timing, etc)
  - Can always pull it back from CVS
  - In particular, ftksim now has only LINFIT
- New config and map files
  - Consistent naming convention
  - Configuration/running script; full automation
- Committed code to CVS
Pattgen – memory issue

Pattgen with rawhits

- 8 banks; each bank has size:
  - 5x10mm – 110M
  - 3x5mm – 320M
  - 2x4mm – ??M, ran out of memory (8gb)

Possible solutions:
- Split into more phi-wedges
- Use constants->patterns (Francesco's work)

In long term, SS size will decrease more!
Sometimes, two roads differ in only one SCT logical plane:
- 1 2 3; 4 5 6 7 8 9 10 11
- 1 2 3; 4 5 6 7 8 9 10 11

Now roadwarrior filters these cases, too
- see new infrastructure in pmap_rd.h

Implementable in hardware?
Need clustering

- Within a given road, we loop over all possible hit combinations, and now accept them all.
- Each pixel layer usually has 2-3 hits
- Large number of combs --> fake tracks:

From ftksim (raw hits):

<table>
<thead>
<tr>
<th>d0,mm</th>
<th>z0,mm</th>
<th>phi</th>
<th>cot(theta)</th>
<th>signed Pt</th>
<th>chi2</th>
<th>hitmask</th>
<th>sector</th>
</tr>
</thead>
<tbody>
<tr>
<td>E -0.182694 132.460101 0.073874 1.125402 -6.344700</td>
<td>2.401985 16383 89384</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E -0.199195 132.836072 0.074336 1.122699 -6.295289</td>
<td>1.916538 16383 89384</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E -0.182513 132.461345 0.073870 1.125415 -6.344101</td>
<td>2.399789 16383 89384</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E -0.199941 132.830938 0.074353 1.122645 -6.297724</td>
<td>1.879119 16383 89384</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

From ipat:

E -0.211459 133.61584 0.074724 1.124708 -6.60034

Will do **clustering** today/tomorrow. Particular suggestions?
Idea: average x and y strips independently. What if there are 3 nearby hits?
Hitwarrior plans

- Do we need hitwarrior? - Will see after I put in clustering. That might be enough.
- Do we need tolerances (i.e. If $|x_1-x_2|<AA$, $x_1$ and $x_2$ are considered common hits)? Or just use the width of 1 pixel/SCT strip? Given two tracks that share 13/14 hits, do we accept both, or let hitwarrior choose best one? Etc...
- Or: can count number of common planes
**Hitwarrior question**

In hardware, will it only compare tracks within a given road? Then it won't catch this:

<table>
<thead>
<tr>
<th>Layer 1</th>
<th>Layer 2</th>
<th>Layer 3</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1.png" alt="Layer 1" /></td>
<td><img src="image2.png" alt="Layer 2" /></td>
<td><img src="image3.png" alt="Layer 3" /></td>
</tr>
</tbody>
</table>

I.e, if clustering occurs on SS boundary, the same track may appear in two different roads.

Maybe this effect is negligible?
SP_7L_3x5, no hw

A few fakes

Weird curvature
A lot more fakes

Even more weird curvature
Tracks are considered common if #common hits > DIMSPA-NPLANES = 7 for SP, 3 for RAW

Still weird curvature
Tracks are considered common if \#common hits > DIMSPA-NPLANES = 7 for SP, 3 for RAW

**PUNCHLINE:**
Both SP and RAWHIT are similar. Fakes were removed with hitwarrior

Better solution: clustering
Will it fix the curvature distribution??
New config system

- Added scripts to data/ directory (now in CVS)
- Readme file: data/README.AK
- Main script: data/scripts/ftk.sh
- Concise naming convention for all files
- Maps in data/map_file; data/ss_file; etc
- Input data list in data/input/
- Running full chain is as simple as:
  - ftk.sh -d raw_11L_3x5_training -a config
  - ftk.sh -d raw_11L_3x5_training -a sectors
  - ftk.sh -d raw_11L_3x5_training -a filter20
  - ftk.sh -d raw_11L_3x5_training -a patterns
  - ftk.sh -d raw_11L_3x5_training -a corrgen
  - ftk.sh -d raw_11L_3x5_bsmumu2 -a config
  - ftk.sh -d raw_11L_3x5_bsmumu2 -a ftksim
  - ftk.sh -d raw_11L_3x5_bsmumu2 -a merge
  - ftk.sh -d raw_11L_3x5_bsmumu2 -a comp
- Submits to a cluster, or runs locally