# RECENT MERGES

- Unit tests merged

  - Documentation coming to
    https://confluence.slac.stanford.edu/display/hpsg/Installing+HPS+Java#InstallingHPSJava-Tests

- Fixes for speed bottlenecks (without changing output) merged

- Approximate helix intersection calculations merged

- min p_T fix merged

  - Incorporates small change to lcsim, to avoid forking lots of classes into hps-java

  - Still a few tracks at higher p_T (up to 500 MeV) that are affected for no logical reason, but determining *why* will be a rabbit-hole … meanwhile the bug needed fixing
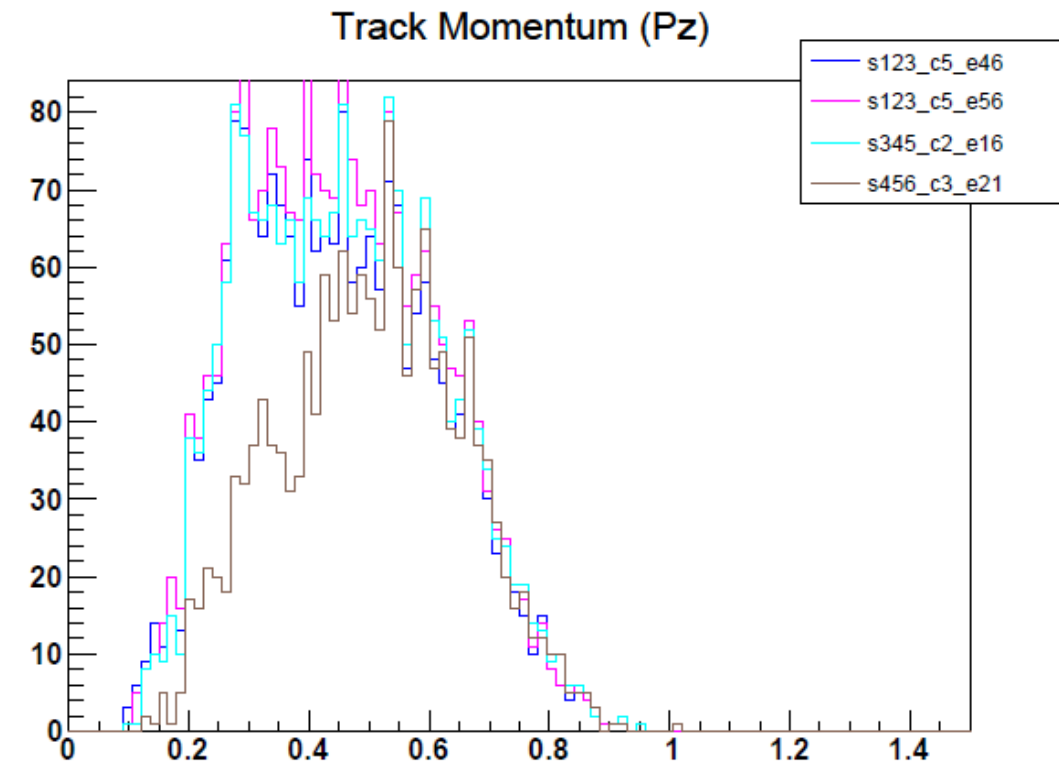
Track Momentum (Pz)

A' Prompt MC
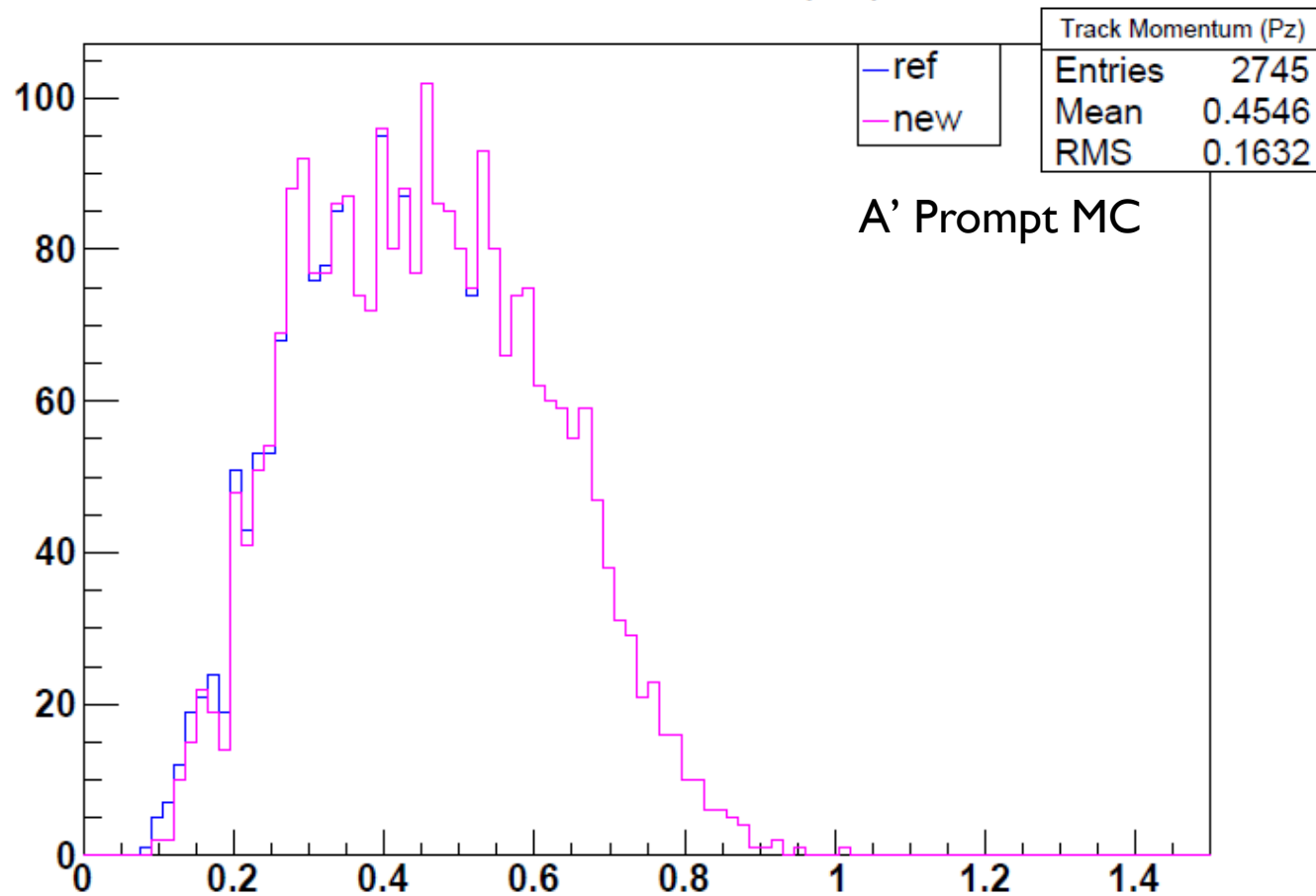
Breakdown by strategy:

MULTIPLE SCATTERING ERROR

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JULY 24 2017

github issue 126

CURRENT CODE

- org.lcsim.recon.tracking.seedtracker.FastCheck ►ThreePointHelixCheck
triplet-finding for track seeds

  - For each of the 3 hits, calculates contribution to *z error*

    ```
    dztot += _nsig * Math.sqrt(hit.getCovMatrix()[5]);
    ```

    | lcsim z
    (hps y) |

  - Then
    ```
    //  Add multiple scattering error here - for now, just set it to 1 mm
    dztot += 1.;   dztot += _nsig * MSerror;
    ```

  - Compares *total z error* to *(predicted – actual) z position* of middle hit

    ```
    if (Math.abs(zpred - z[1]) > dztot) return false;
    ```

- But if _nsig is too big, dztot is so big (regardless of MSerror) that no seeds ever get thrown out here … which is the default case
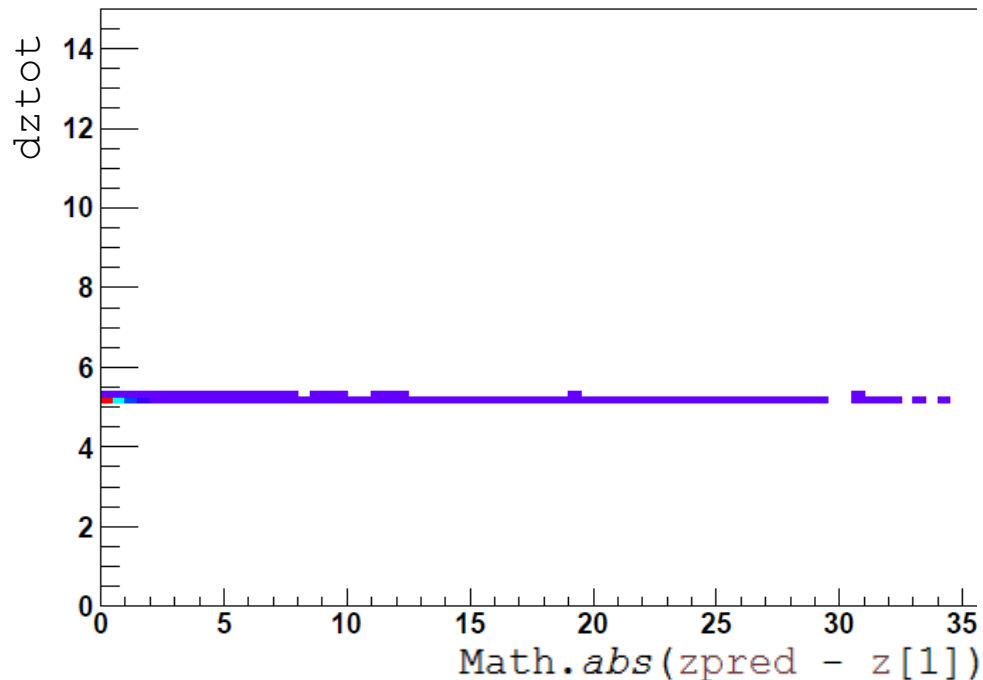
  ```
  _nsig = Math.sqrt(strategy.getMaxChisq());
  ```
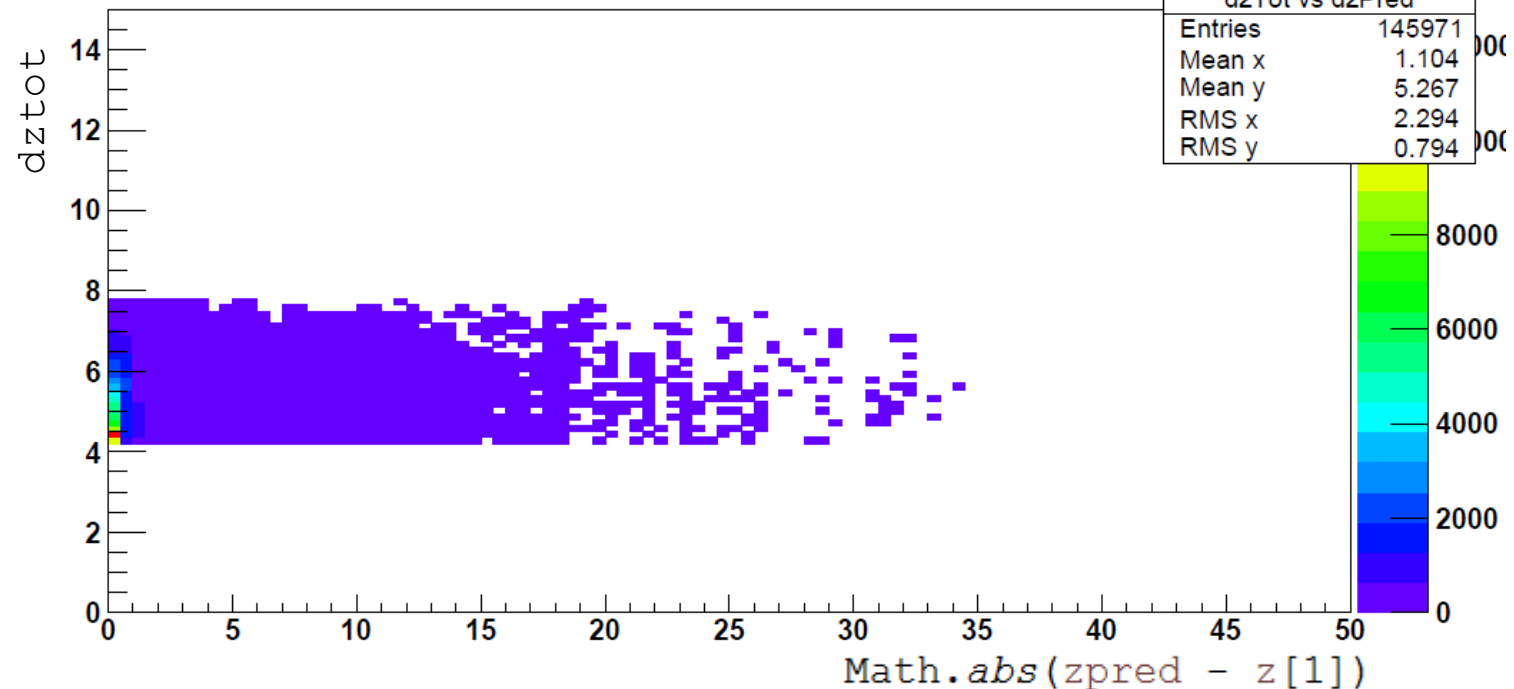
  | MaxChisq = 100
  _nsig = 10 |

FIXING THE CODE

- Decouple _nsig from Strategy.MaxChisq
- MSerror has greater effect at lower _nsig
- But still not as much effect as we had expected, because even at _nsig=1, dztot is big

MSerror = 1.0, _nsig = 1

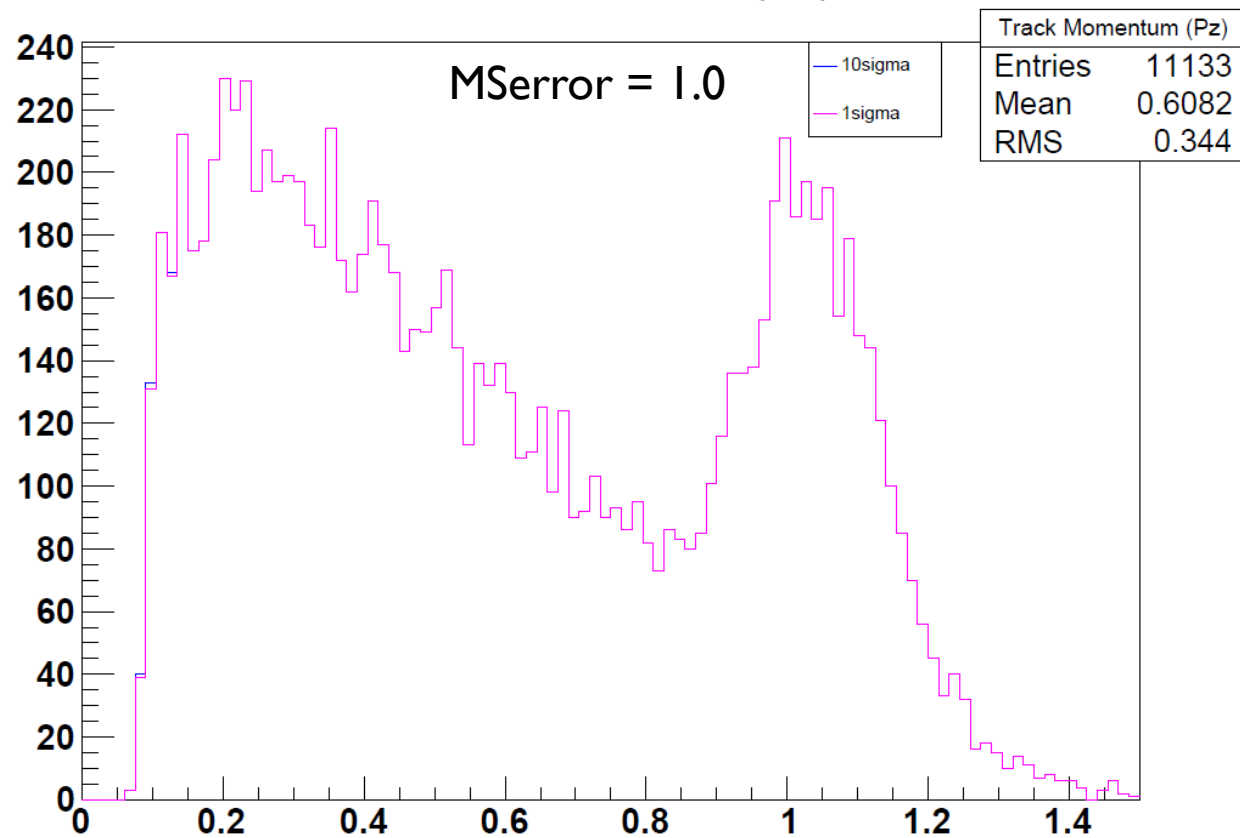Proper MSerror, _nsig=1

dzTot vs dzPred	
Entries	145971
Mean x	1.104
Mean y	5.267
RMS x	2.294
RMS y	0.794

NOT MUCH EFFECT ...

Track Momentum (Pz)

MSerror = 1.0