Tracking and Fitting with SODTracker & KFFitter

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SiD Workshop, SLAC
October 26, 2006

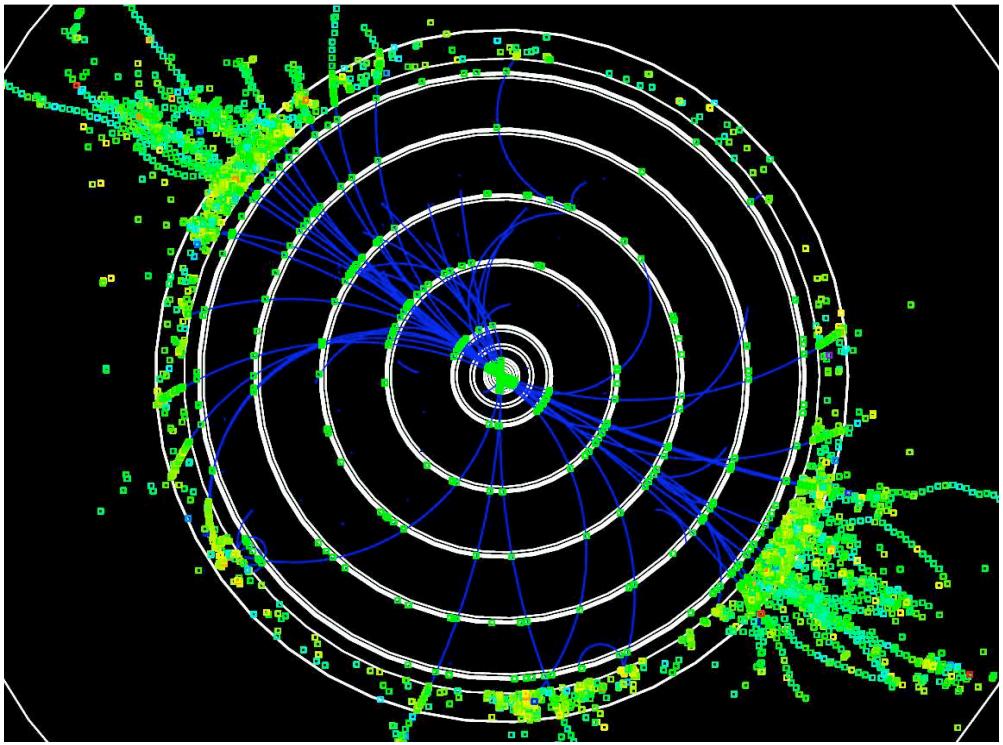
Tracking: SODTracker

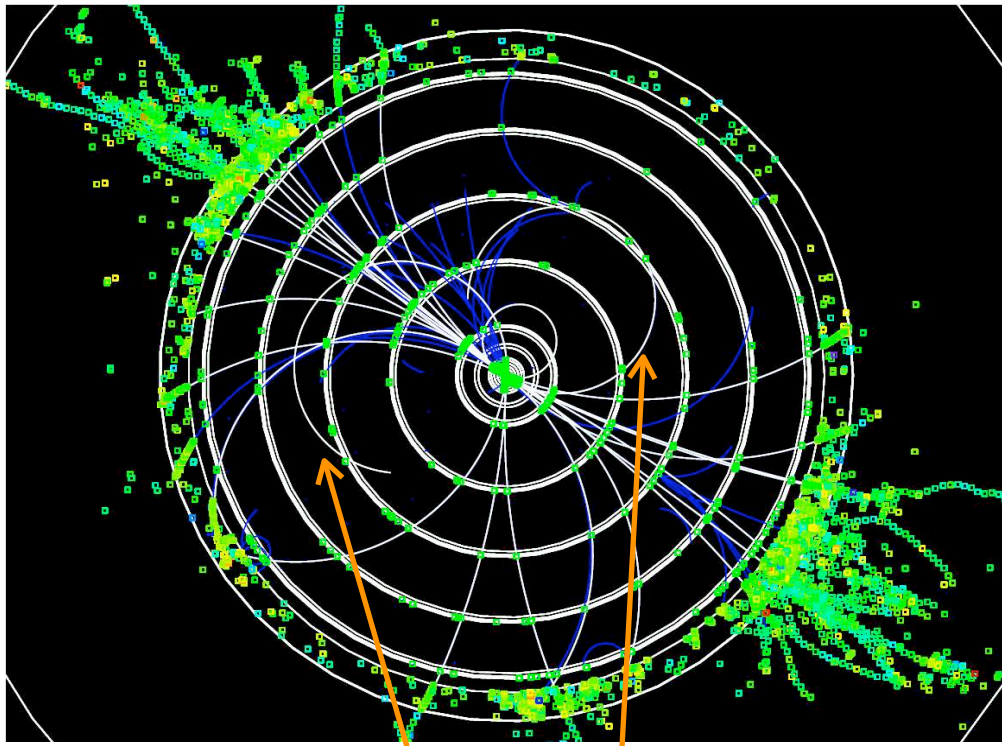
- Track finding in the Silicon Outer Detector (SOD)
- Tracking method:
  1. **Obtain seed track in the Vertex Detector** (VD)
     - seed tracks from hit combinations in VD or from MCParticle true information (cheat track).
     - can use Tracks from any track finder when available.
  2. **Add hits from the Tracker**
     (Barrel only for now; Endcaps coming soon)
  3. **Fit track**
     - **Helix fit** (or Kalman Filter with KFFitter)
  4. **Insert SODTrack in event**

SODTracker package

- Code ported from *hep.lcd* to *org.lcsim*
- Results stored in **SODTrack** object (implementation of *org.lcsim.event.Track)*
- SODTracker package in CVS (*org.lcsim.contrib.SODTracker*)
- Tested on single track and physics samples
  - runs without crashing
  - allows visualization of SODTracks on event display and event browser (see next page)
- Package contains test driver in *test/TestSOD.java*

Event display for $e^+e^- \rightarrow Zh$ MC

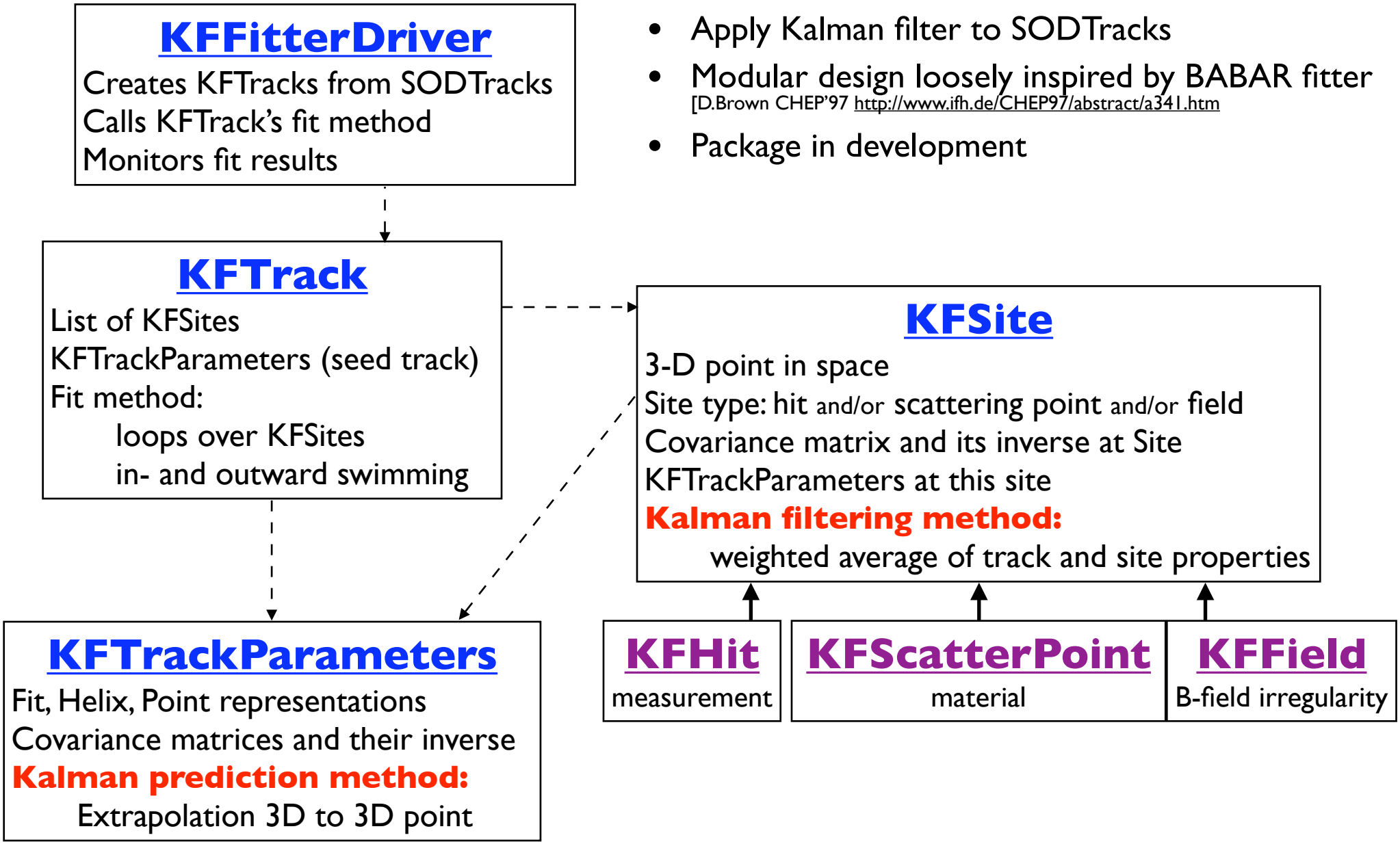




- **MCparticles in blue**
- **SODTracks in white**
- Show barrel only
- Most barrel tracks are reconstructed (including curlers)

Kalman Filter Fit: KFFitter

- Apply Kalman filter to SODTracks
- Modular design loosely inspired by BABAR fitter
  [D.Brown CHEP'97 http://www.ifh.de/CHEP97/abstract/a341.htm
- Package in development



KFFitter: development status

- Infrastructure: done
  - classes + methods + calls between objects
- Prediction and Filtering methods
  - almost done: chasing bugs
- Being developed in barrel
- Scattering points not included yet

Summary

- **SODTracker:**
  - efficient hit adder for the outer detector (with Helix fit)
  - available in *org.lcsim.contrib.SODTracker*
- **KFFitter**:
  - Kalman filter fitting package
  - modular design
  - at final stages before successful fit!

- Packages to be combined for **Kalman-based hit adding**