BigBite Tracking Software
Status Report

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Status

- Essential tracking steps implemented
- Extensively tested and debugged during E06-007 in March
- Target reconstruction working, some open issues (Jin)
- New event display available (3D view, projection views), still being debugged
- Development version of Podd analyzer (1.5) well tested, nearly completed
- Some "like to have" items still missing (see later)
- Ready for production

Experience

- 12 plane configuration actually much slower to analyze that 15 planes. Chambers do not provide enough information to reject arbitrary combinations of front and back hits.
- Requires good geometry information to work well
- Time-to-drift distance conversion well understood
- Poor position resolution: 750-1000 μm. Different operating conditions than G_E^n?
- Tracking efficiency/issues: see Xin's talk
- Multi-threading of TreeSearch core algorithm implemented, but somewhat disappointing
- Speed about 100 Hz with very noisy data on Intel Core2 6600. Seems to benefit greatly from large L2 cache (4MB)

To Do/Possible Improvements

- Precise alignment (iterative optimization underdetermined)
- Investigate events where event display shows tracks not found (Xin's talk)
- Detailed **Monte Carlo tests**
- Detailed comparison (not just numbers of tracks) with G_E^n code
- Add ability to use scintillator or shower plane to pre-filter tracks. Expected to improve speed greatly.
- Implement FineTrack() to apply precision corrections for offline replay ($\cos\theta$, fringe field, timing, etc.)
- Multi-thread entire Podd analysis chain for maximum performance on multi-core CPUs (volunteers?)