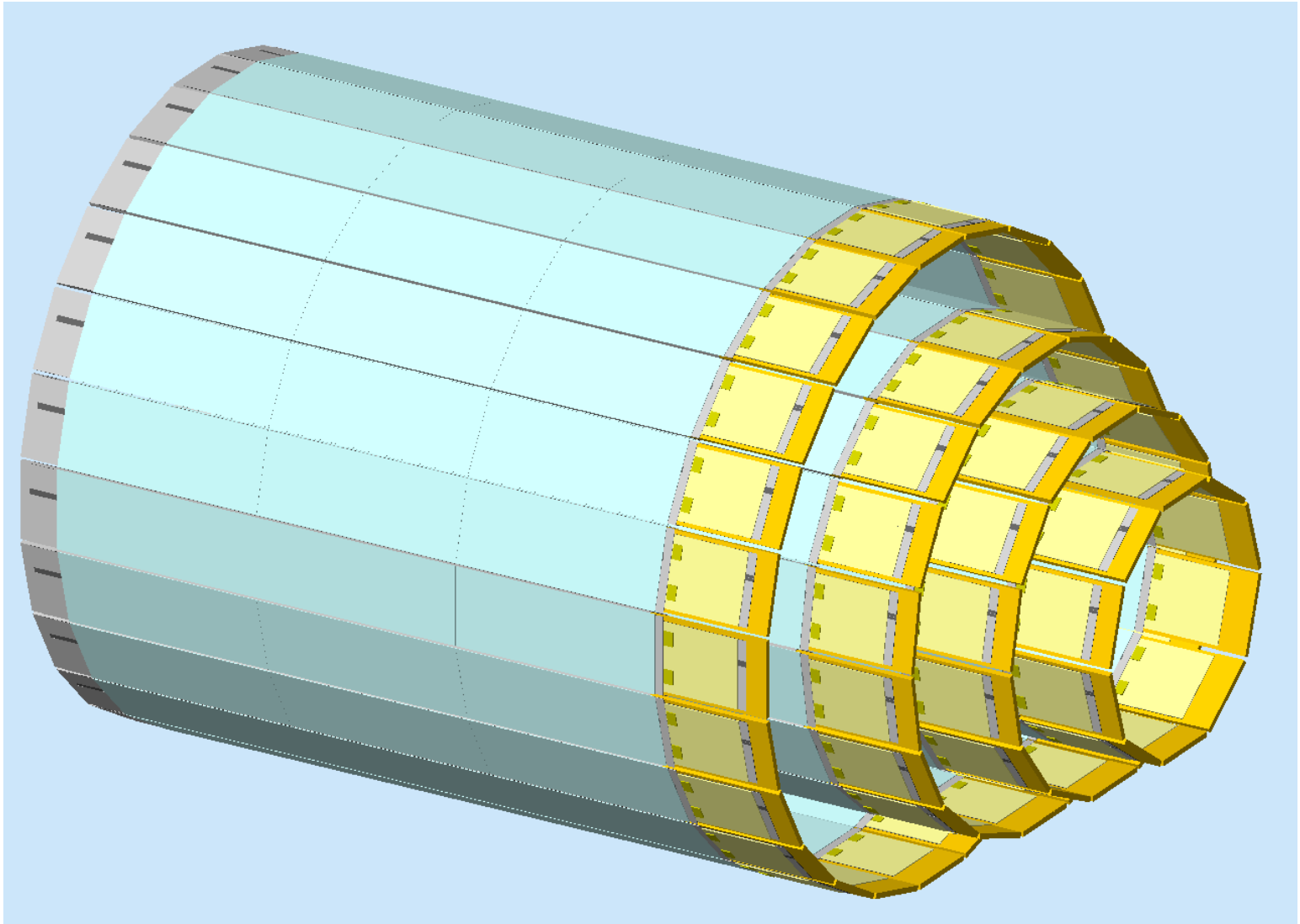
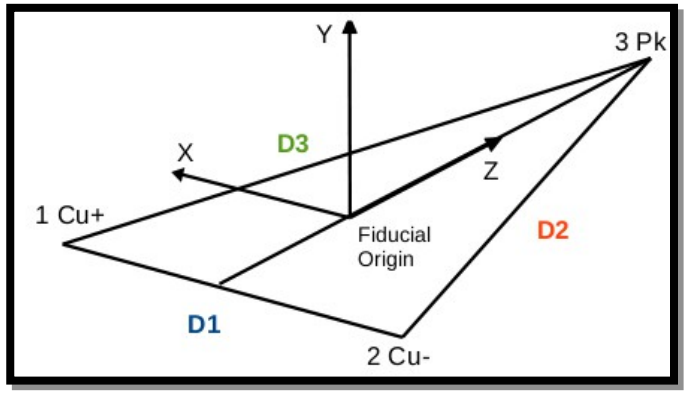
GEMC BST Java Variation

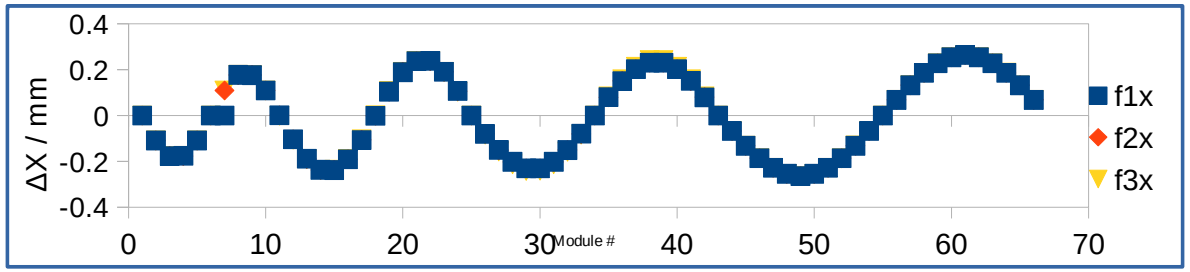
Checked parameters in hit process.
Checked volume overlaps.
Checked clean repository.
Submitted PR on GitHub.

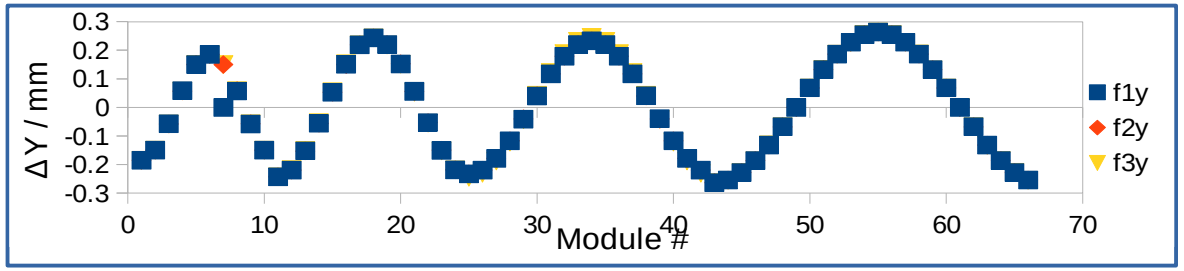


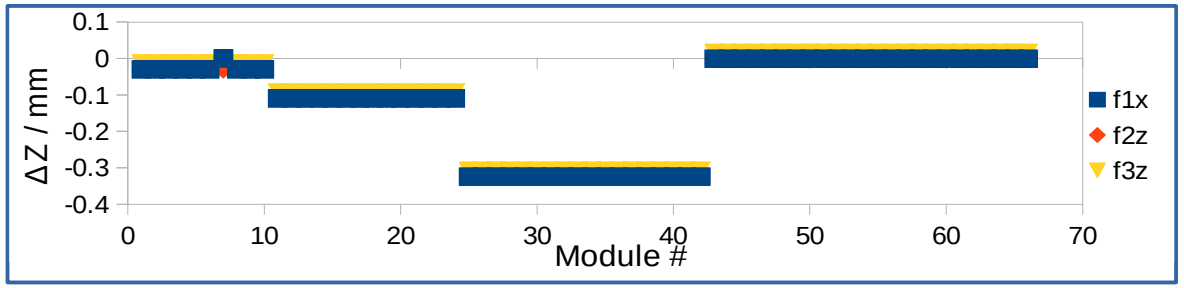
Nominal and **Survey Ideals** Differences

Before

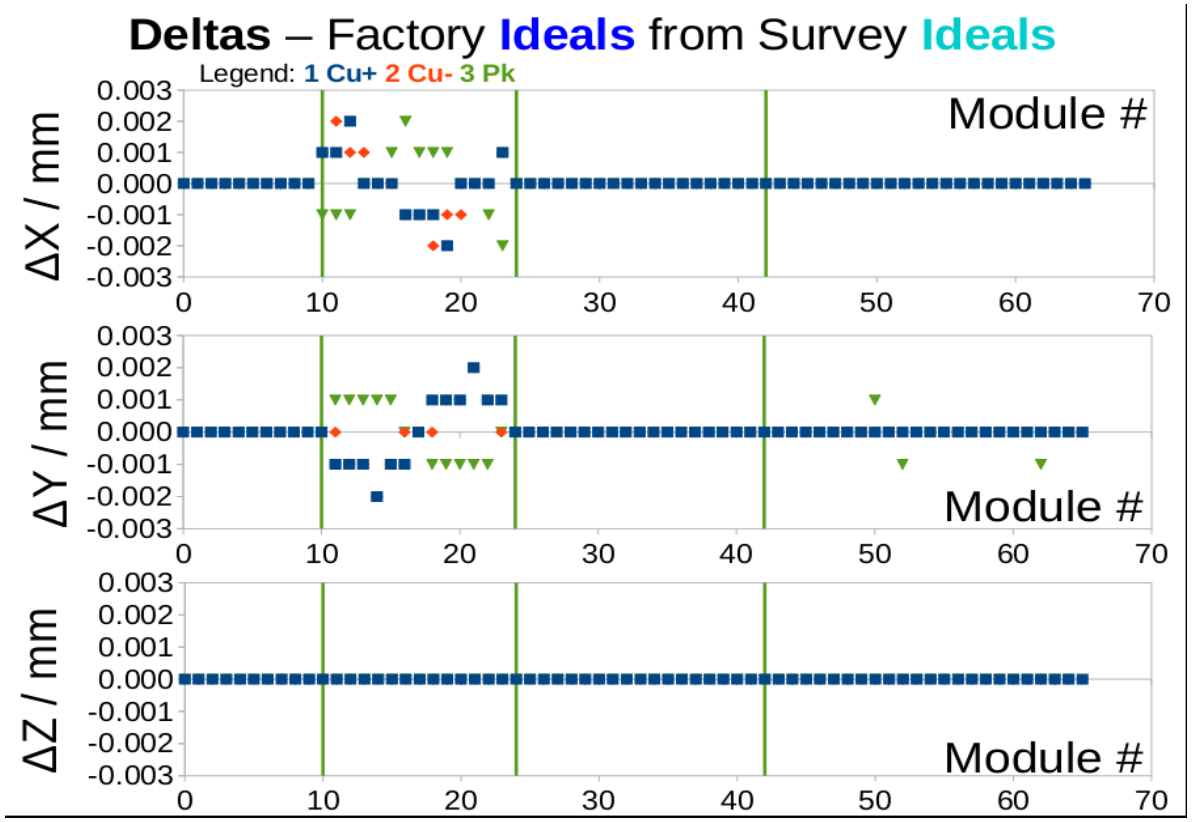








After



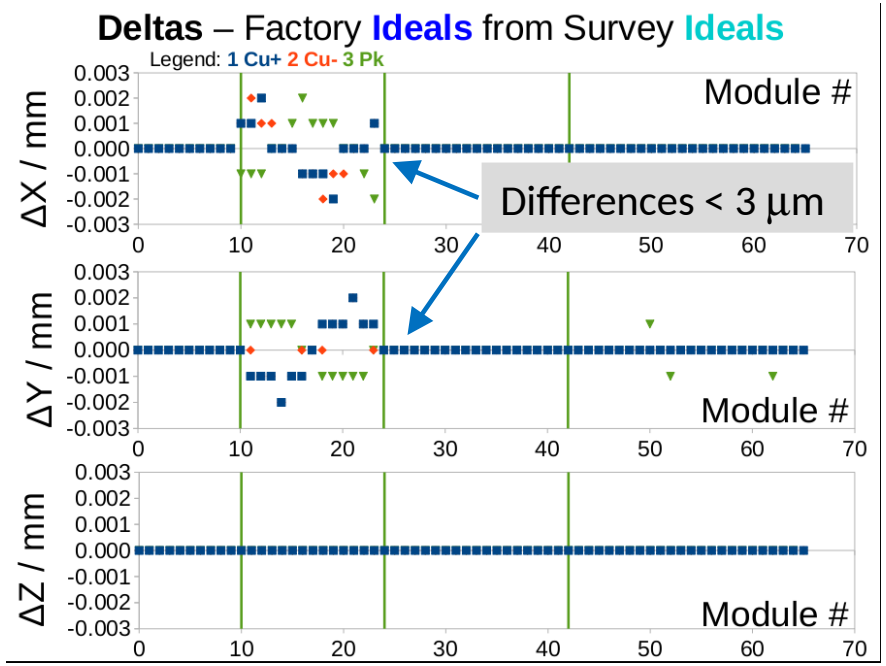
SVT Geometry Software

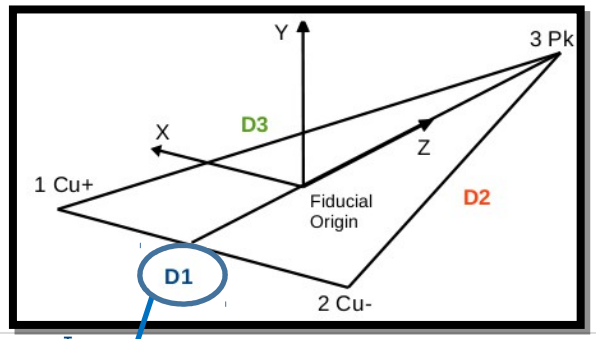
- SVTFactory
  - SVT**Constants**
    - Connects to CCDB and loads core parameters.
    - Option to load alignment shift data from file.
    - Provides conversions between indexing conventions.
  - SVT**Strip**Factory
    - Geometry factory for sensor strips.
  - SVT**Volume**Factory
    - Geometry factory for detector volumes.
  - SVT**Alignment**Factory
    - Geometry factory for fiducial points and file I/O for alignment data.
- Alignment
  - AlignmentFactory
    - **Universal** class for processing and applying alignment shifts to points and volumes.
- Misc
  - Util
    - **Universal** utility class for vector and volume **manipulation**, rotation conversions, and file I/O.
  - Matrix
    - **Univerisal** class for basic matrix algebra.
    - Supports **conversions** for 3D rotations: Tait-Bryan, axis-angle.

wget http://userweb.jlab.org/~kenjo/geom/jcsg-0.3.2.jar

Alignment of the Silicon Vertex Tracker (SVT)

- Ideal Geometry Validation and Testing
  - Calculate ideal fiducial location on each module.
  - Observed significant difference with engineering drawings - up to 100 µm.
  - Worked with engineers to correct differences.
  - Ideal geometry now well defined with parameters from engineering drawings.
- Geometry package
  - Common Java utility to access geometry for gemc simulation and reconstruction.
  - Generate shifts from ideal geometry to measured fiducial results.
  - Processing fiducial survey data in alignment shifts – validating with simulated tracks.
  - Putting full inventory of material in SVT gemc simulation.





Fiducials form triangle on sensor.