BERKELEY LAB
Bringing Science Solutions to the World

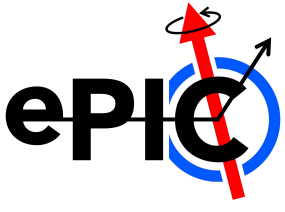
U.S. DEPARTMENT OF ENERGY
Office of Science

Silicon Tracker Geometry To-do

Shujie Li

ePIC SVT DSC meeting

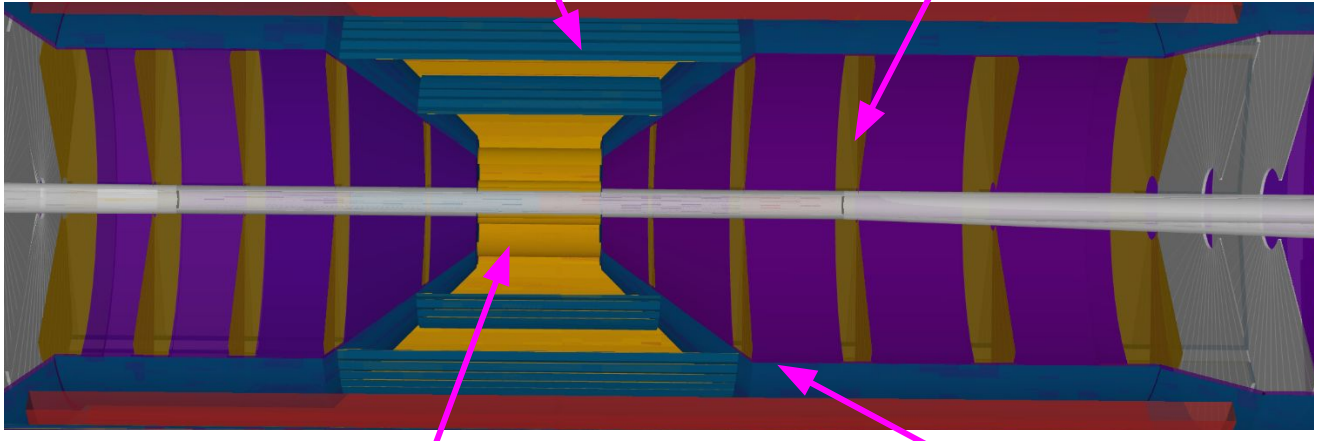
July 9, 2024



Silicon Tracker Simulation Status

Outer Barrels: new LAS stave design

Disks: tiles with off-center hole

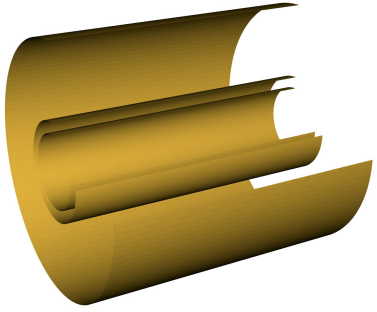


Vertex layers: sensor unit and supports

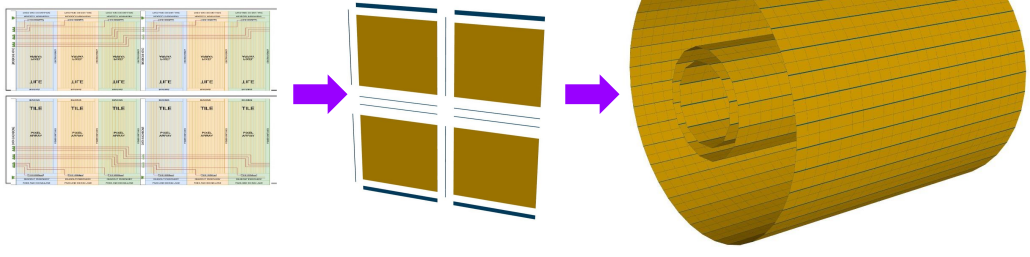
mechanical support
and service materials

1. Vertex layers

- **Official simulation:**
  - smooth barrel assembled by 128 staves per layer



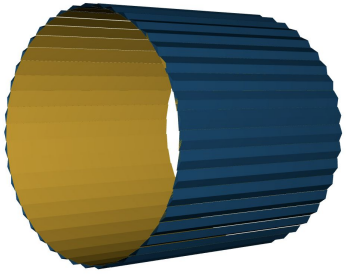
- **Recent development:**
  - RSU with inactive surfaces
  - by Jonathan Witte (Eberhard Karls Universität, graduated)
  - github: https://github.com/eic/epic/tree/si_sensor_unit/compact

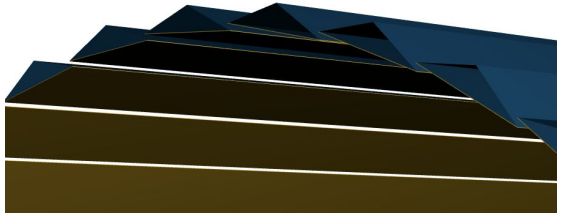


- **To do:**
  - use smooth cylindrical surface instead of staves
  - apply the same RSU design on outer barrels and disks
  - check tracking performance (Joseph Xu, UCB summer student)

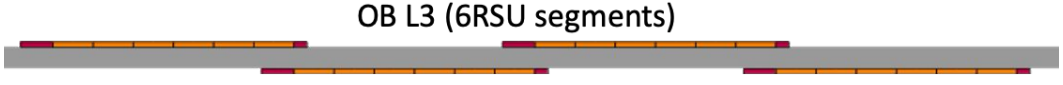
2. Outer Barrels

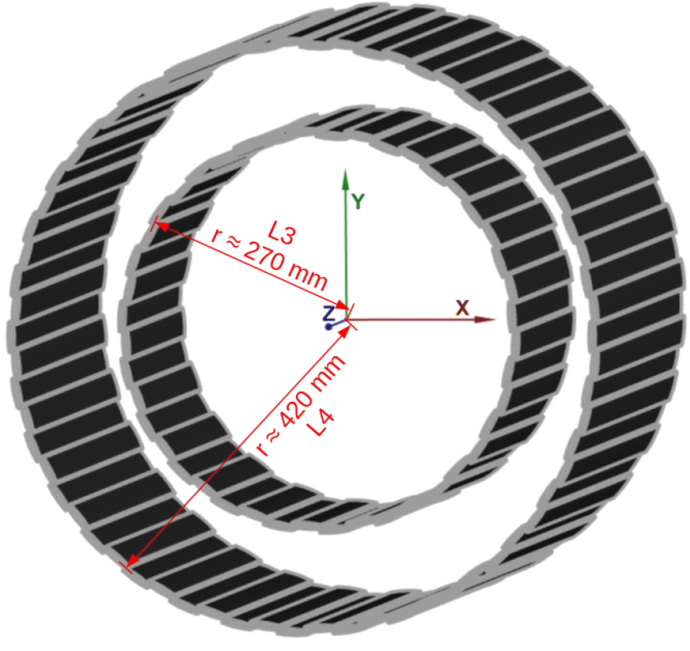
- **Official simulation:**
  - 44 tilt staves (Si+Al+carbon fiber pla
    with triangular support





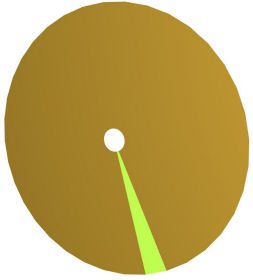
- **Work in progress:**
  - implement the new LAS design. See Georg Viehhauser's presentation at SVT meeting
    https://indico.bnl.gov/event/23659/
    (Long Li, U. of Birmingham)

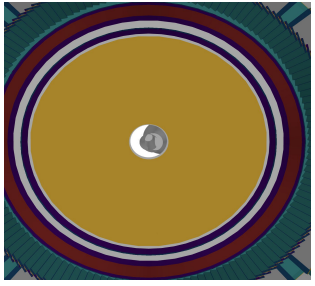




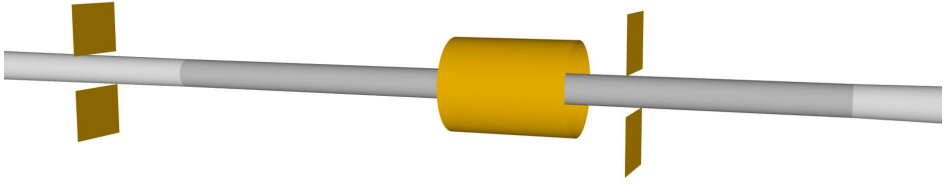
3. Disks

- **Official simulation:**
  - disks from 36 trapezoid slices.
  - a centered hole in the center to accommodate for the beampipe fanout





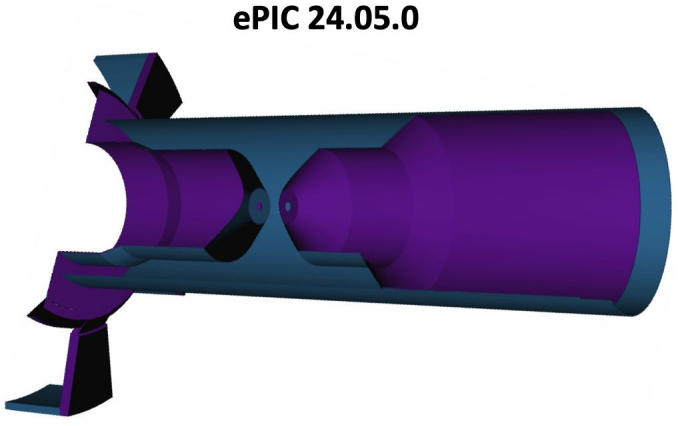
- **Recent developments:**
  - new geometry plugin to allow disks from tiles with asymmetric layout (Shujie Li, LBL)
  - https://github.com/eic/epic/tree/si_disk_hole

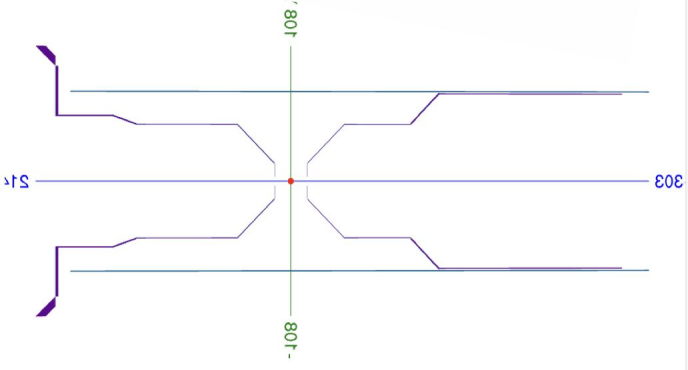


- **To do:**
  - implement the tiled disk layout (once available) with the new geometry plugin
  - acceptance and tracking performance study

4. Services and Support Structures

- **Official simulation:**
  - New support cone and materials according to CAD model (Wouter Deconinck, U. of Manitoba)
  - https://github.com/eic/epic/pull/661





- **To do:**
  - implement the inner barrel support structure
  - check and update the material budget with the new silicon tracker design