SiD Stretched Tracker: Preliminary Geometry Update

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Fermilab

Barrel and Disk Geometry Proposal

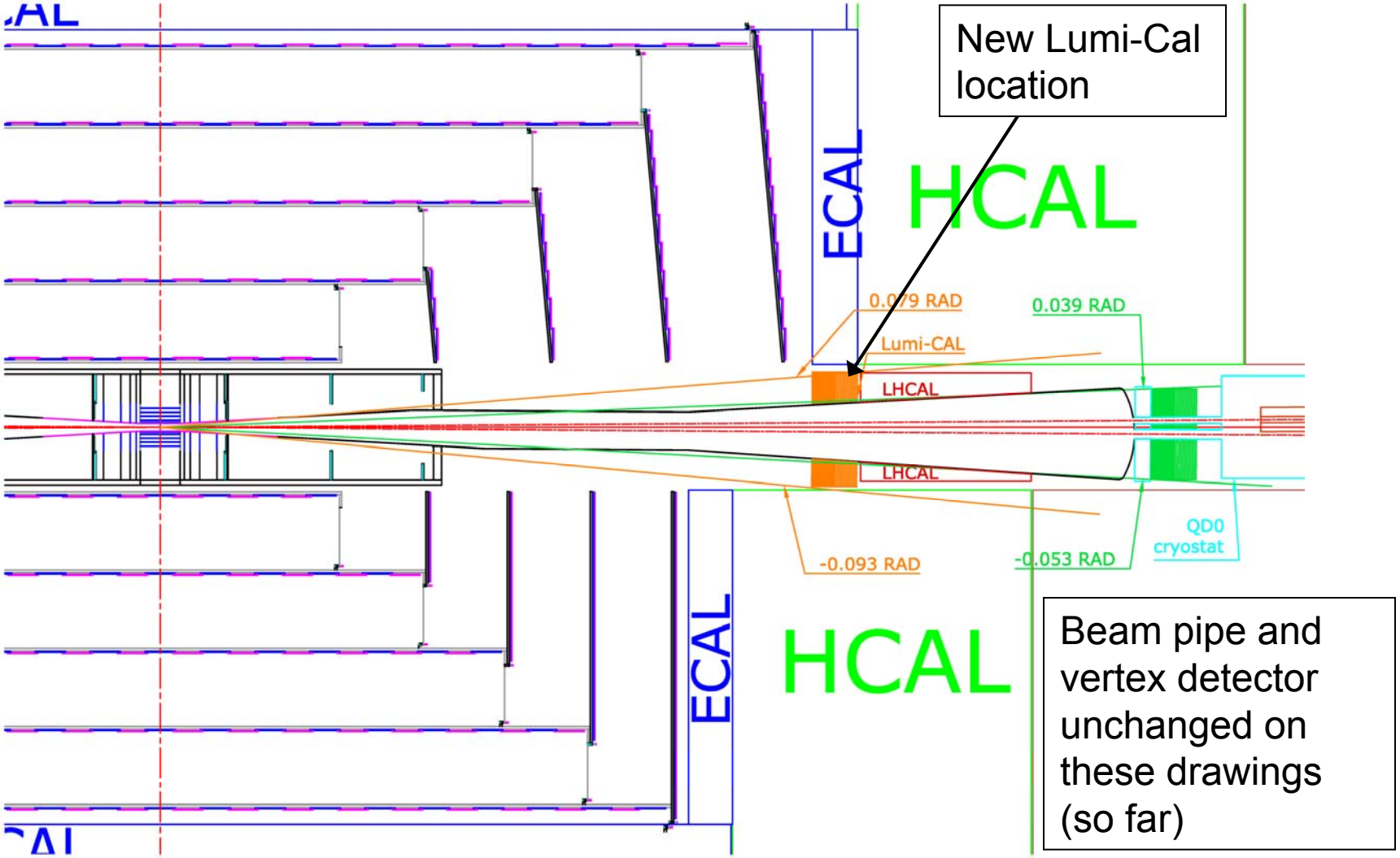
- Barrels 3-5 extended
  - Barrel 3: extended one sensor per half-length
  - Barrel 4: extended two sensors per half-length
  - Barrel 5: extended three sensors per half-length
- Disks follow the surface of a shallow cone
  - DZ/DR = -atan(5^{o})
    - Could be at a slightly larger angle, depending on mounts and connectors
  - Sensors are normal to the beam line
  - Sensors are assumed to be mated back-to-back to obtain stereo.
    - Wrap-around copper on kapton circuits for bias and ground connections as in D0 Layer 0

Barrel and Disk Geometry

- Wedge sensors are shown in the preliminary layout.
  - Hexagonal sensors were also considered.
    - It is more difficult to understand a good way to provide overlaps with hexagonal sensors.
- R overlap is obtained by “shingled” geometry
- Phi overlap is obtained by placing sensors at different Z’s
  - Blue sensors at one set of phi angles
  - Magenta sensors at another

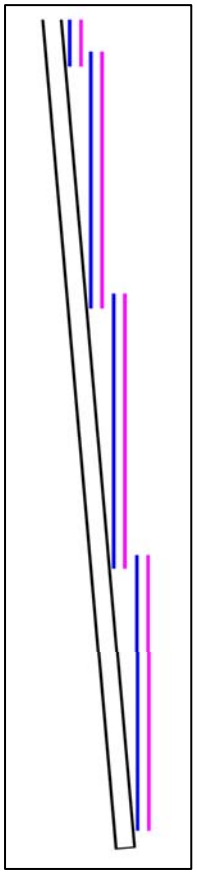
Barrel and Disk Geometry

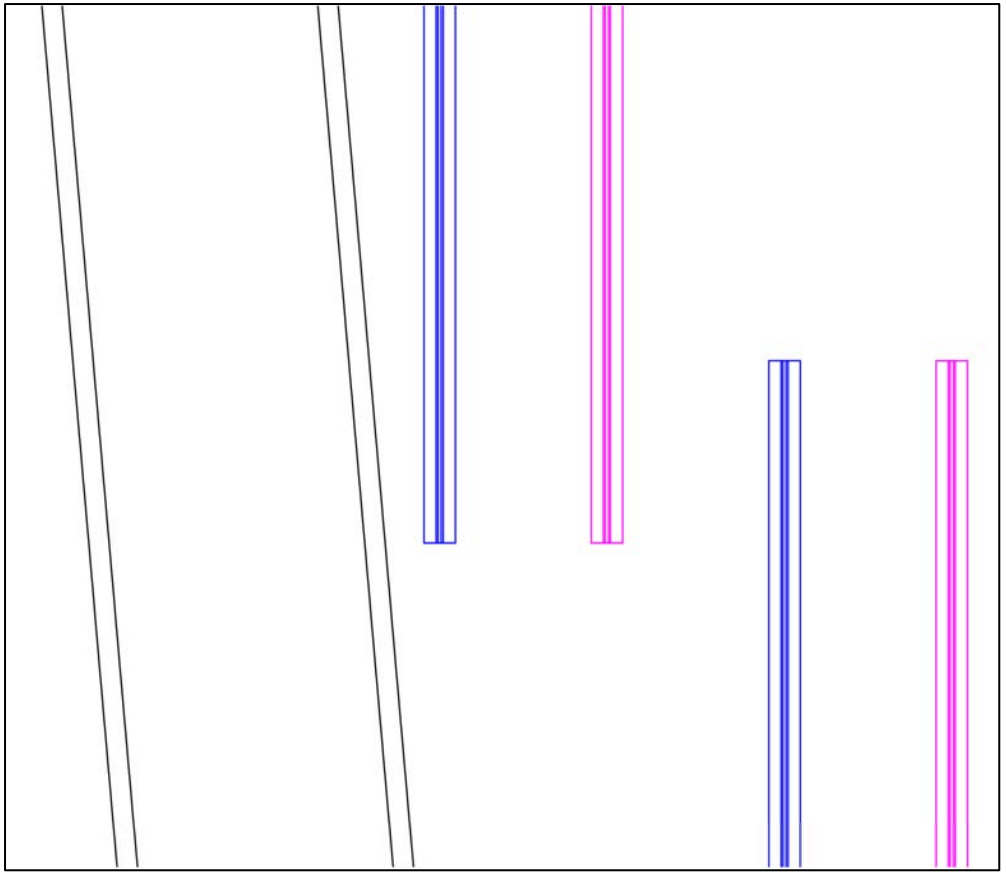
- Old layout at the bottom, new at the top



Barrel and Disk Geometry

- Construction is modular, as in the barrels.
- Enlarged portions of disk 2 are shown below.
- Connectors, mounting details, and module details remain to be developed.



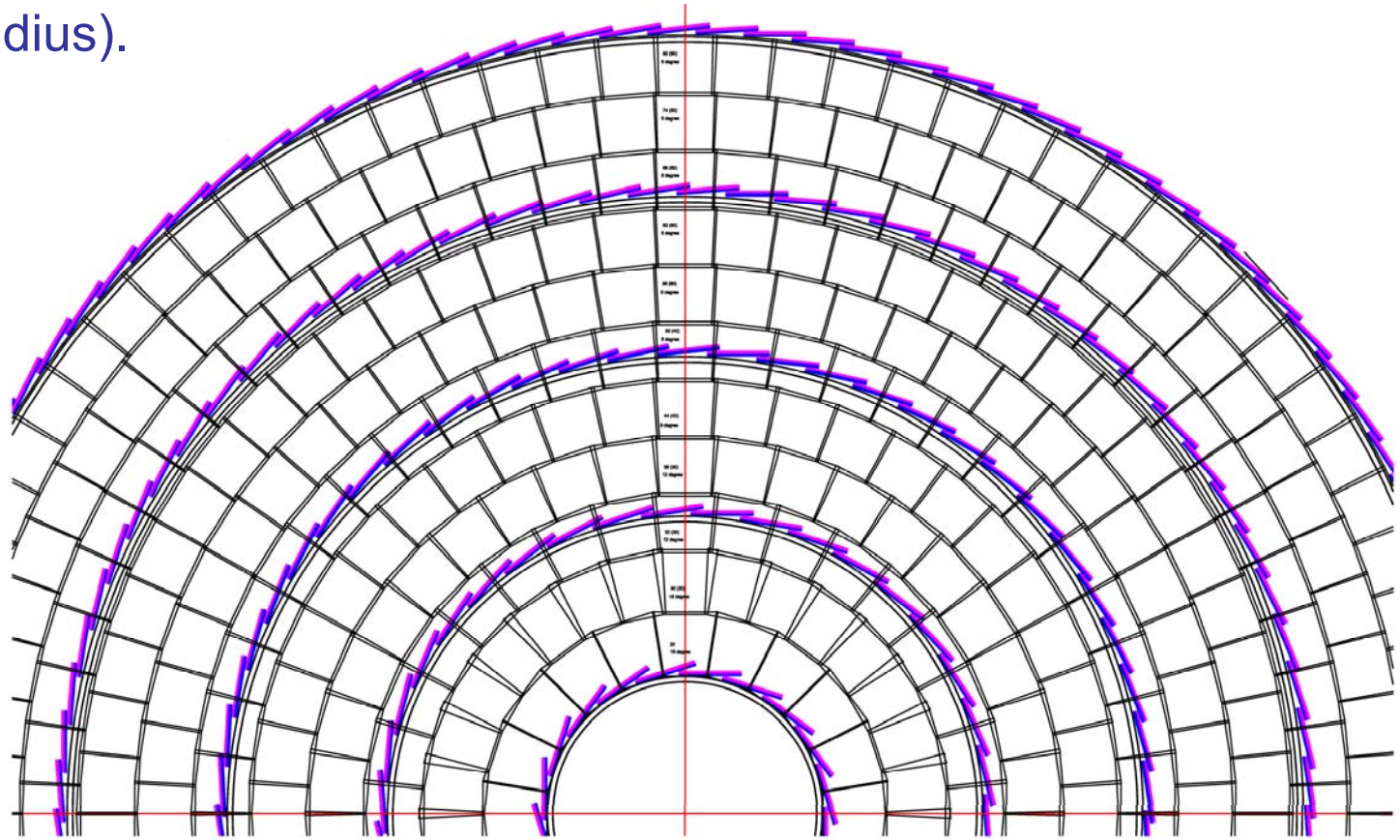


Barrel and Disk Geometry

- Cone shape allows less support material for a given stiffness in Z.
- Assembly is assumed to progress from the outer radius inward.
- Disk 2 replicates disk 1 details, disk 3 those of disk 2, etc.

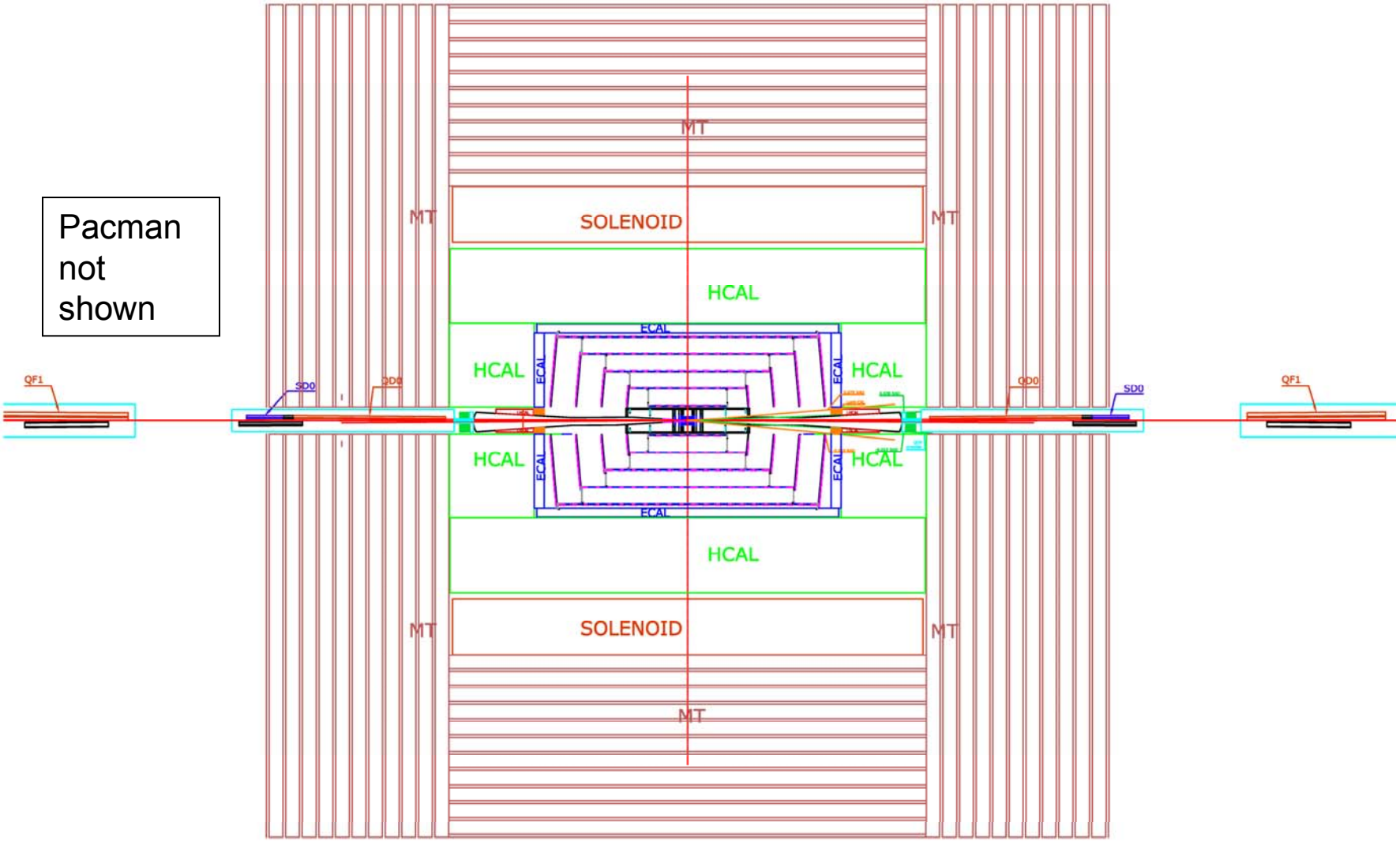
Barrel and Disk Geometry

- Four sensor varieties (6” wafers)
- Wedge dimensions remain to be adjusted to obtain proper overlap with barrel ends.
- Included stereo angle ranges from 18^{o} (inner radius) to 6^{o} (outer radius).

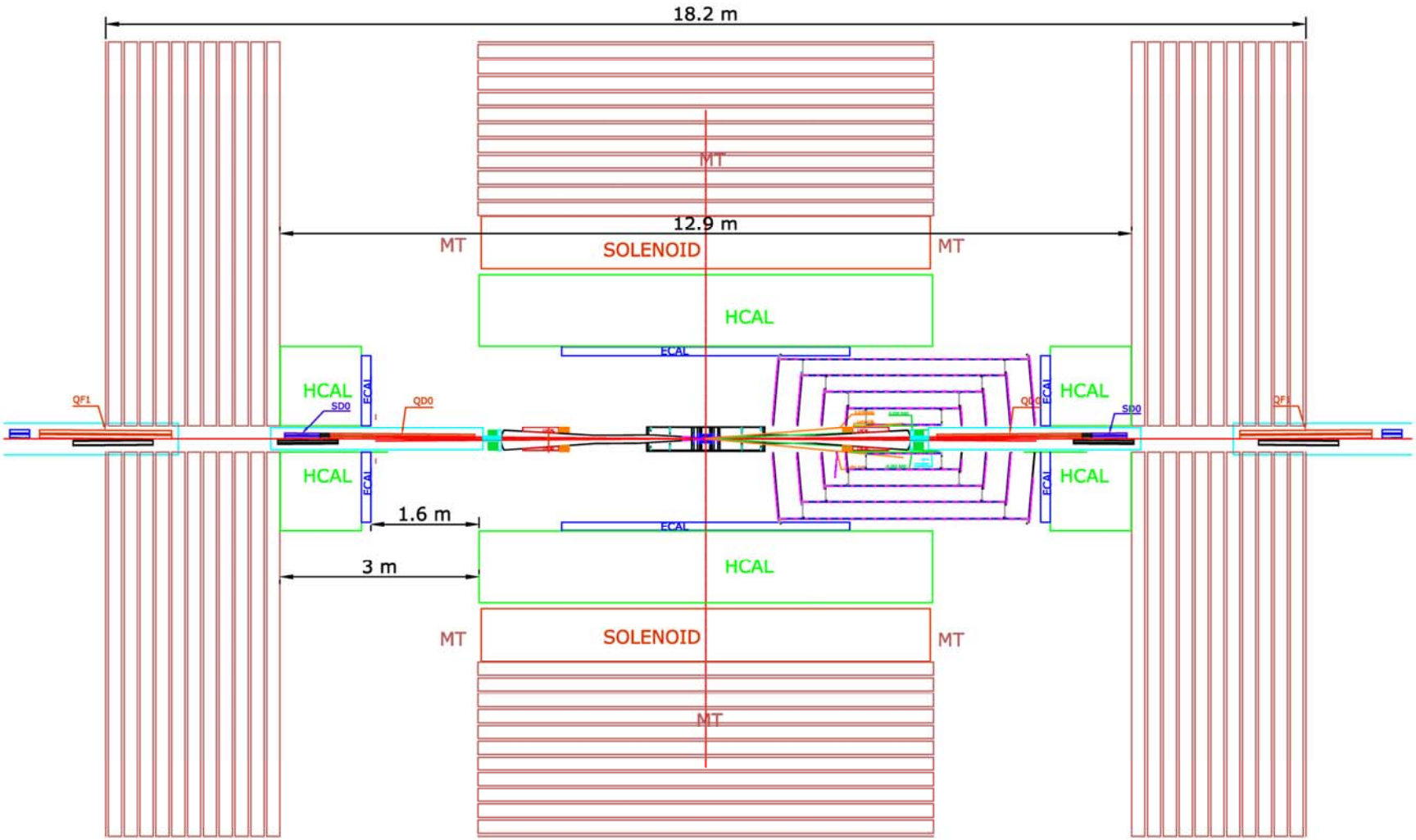
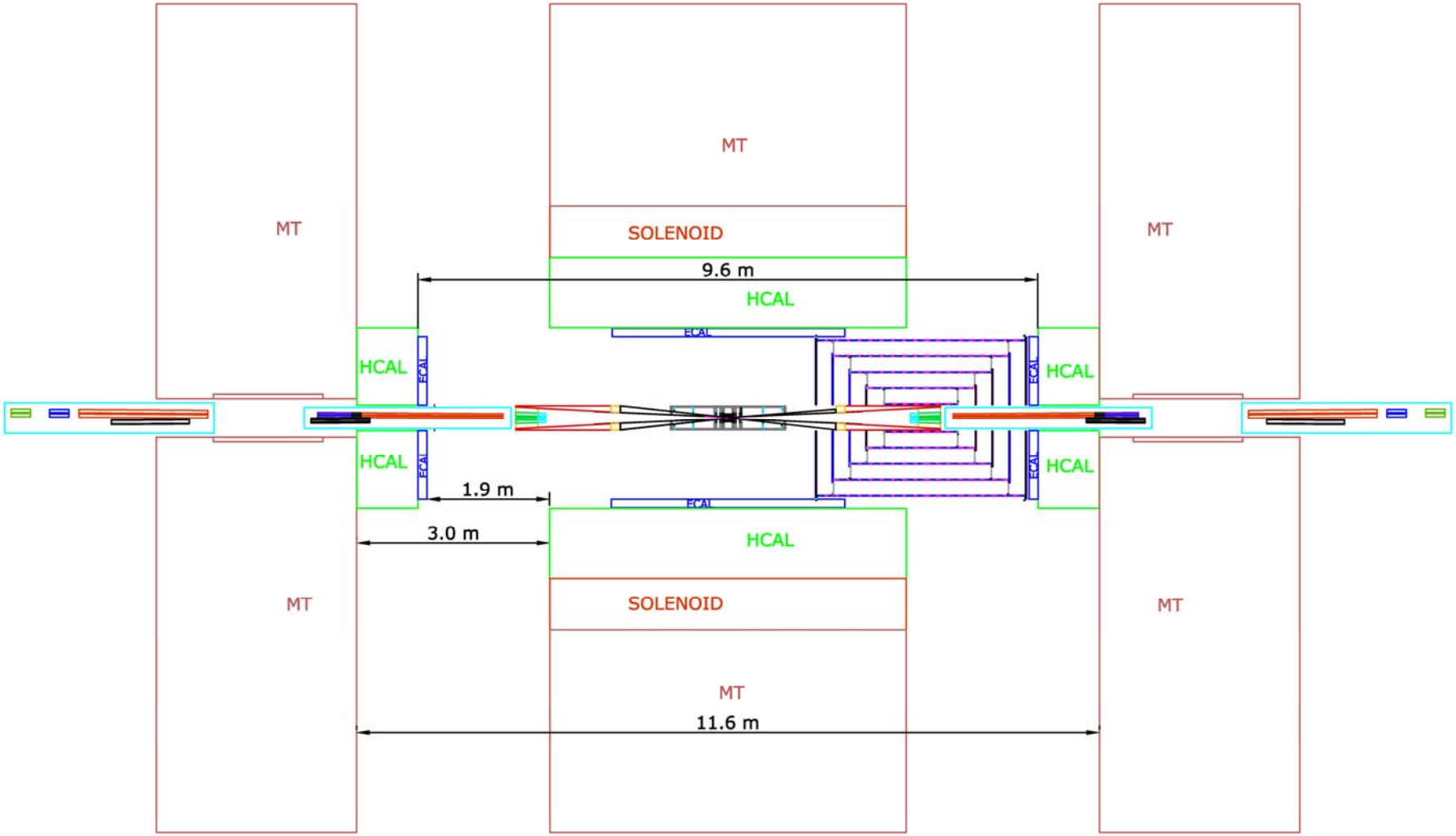


Detector Closed

Pacman not shown



Detector Open for Servicing



September 2007 Geometry