Baseline Sector Status Summary

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Since the FDR in June

- Evaporative cooling tests completed just after FDR.
 - Worked well -see examples next pages.
 - Smaller hydraulic diameter OK
 - Possibility of running three sectors in series appears feasible but needs test to confirm.
 Possible in December.
 - Substantial headroom in design(for <0° operation)
 - See complete presentation and other information on this at
 - http://www-physics.lbl.gov/~gilg/template2.html#Pixel Mechanics Documents
- Pressure and pressure cycling test for Al-tube
 - Completed up to 10 bar gauge.
 - Thermal performance appears to have improved slightly after pressurization.
 - Cause is believed to be slight expansion of tube wall. Convex vs concave.
 - Will pressurize tubes before assembly in future.
 - Distortions acceptable.
 - FEA predictions(see Bill's talk) in rough agreement with small distortions seen.
 - This looks good so far.

(lbl_12)Sector 7+8 - Power Margin



(lbl_14)Simulate 3 Sectors in Series





Sector Under Pressure Test



Some Pressure Test Results



Point on Sector

More Since FDR

- Thermal cycling
 - Measurements done from about 20C to about 5C
 - Distortions seen are <1 micron/^OC BUT see uniform motion rather than pattern expected for CTE mismatch between silicon and carbon-carbon. Don't understand why. Have to repeat measurements.
- Carbon dust and particle problem
 - Parylene coated one sector(about 7 microns). Appears to solve problem of both carboncarbon dust and particles from carbon foam. Thermal performance not significantly changed. Proposed as baseline solution but will add to radiation length by <0.05% (mostly from foam). Radiation tests underway.
- Irradiation
 - Irradiate Hytec test piece to 50 MRad. No change in thermal performance just like Altube test piece.
 - Irradiation of complete Al-tube sector planned but will take some time.
- Coolant connections -> see Neal's talk
- Corrosion (of Al) -> see Eric's talk
- Hytec disk results -> see Bill's talk.
- Production planning improved and additional sectors under fabrication. These will also be tested after pressure and temperature cycling.

Issues Still Not Fully Resolved

- Thermal-change-induced deflections to be remeasured and compared with FEA. Possible by December.
- Quality control procedure to verify sector thermal performance
 - Working on it but still not solved too slow. By December if scheme presently proposed works.
- Z distortion budget. Need to better understand combined motion from sector(thermally induced), ring, forces...
- Adequacy of measurements of effects of C₃F₈ under irradiation
 continue testing and December possible.
- So far no reason to change baseline from aluminum-tube sector. Sealed-carbon tube development by HYTEC will continue for other reasons.....backup if unforeseen problem appears.
- From sector status alone, PRR in December remains feasible.