pfRICH Outstanding Design Questions

Engineering/Design Meeting

11 Mar 24

Mirror Curing

- Bakeout of the mirror coating to 300C
  - What is the purpose?
    - Gain in reflectivity?
    - Mechanical/Chemical Bonding?
    - Longevity?
- Implications:
  - Lexan Tg is much lower than 300C
  - Current CF substrate cannot withstand 300C
  - Bonding of substrate to the mirror at 300C?
- Solutions:
  - Material choice?
  - Bakeout at lower temperature for longer?
  - Do not perform bakeout?

Mirror Substrate Attachment

- Current mirror attachment protocol is using 3M epoxy and "flooding" the epoxy and pressing the Lexan to the substrate during curing. We are also looking into using a vacuum bagging to apply the bonding pressure.
- Notes:
  - Attempts have shown various levels of success with waviness/air pockets
  - How well does this procedure work for the full-scale (curved) mirror process?
  - How do we integrate this into the mirror layup procedure?

Sensor Mounting / Sealing Options

- HRPPD sensors need to be placed into the sensor plane grid and sealed. They need to be gas and light-tight. Current thought process is to seal the sensors with a radial o-ring.
- Problems:
  - The first round/prototype sensors are already in production, and modifications to add an o-ring groove isn’t feasible.
  - The sensor grid is relatively complex to manufacture in CF, adding in a taper would be a lot of work
  - The sensor grid is fairly thin, adding in threaded inserts into the corners around each sensor would further weaken the structure
- Solution:
  - For prototyping, we could make an adaptor that would add a radial o-ring groove to the sensor (TBD)
  - Add a 3D-printed tapered component to the pocket of each sensor that would allow the o-ring to compress as the sensor is being placed.
  - Use the water-cooling piping (with attachment points on the edge of the sensor plane) to retain the sensors in their pockets.
    - Implication: sensors can only be removed during maintenance in a horizontal position. (Can pfRICH be removed in IP?)

Final Assembly/Transport of pfRICH

- The final assembly procedure and location have not yet been determined, but the project is requesting that we put our requests in for space needed/clean room availability/etc.
- What work should be done at SBU vs BNL?
- Mirror scans?
- How assembled should we be during transport?
- Other considerations?