ALPIDE staves in vacuum?

Mar 9 2021

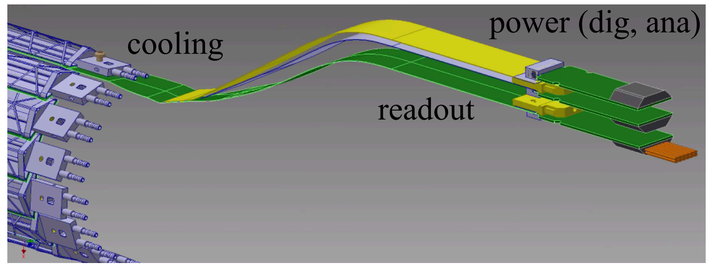
Possible issues

- **Outgassing:**
  - all the stave components will outgas when we pull the vacuum the first time.
  - outgassing will cause a shrinkage/deformation of the structure whose entities is typically contained and should not affect the structural behaviour, but could have some impact on the sensor position.
  - Some additional precaution should be taken during assembly to minimise humidity absorption (bake-out of the carbon before gluing chip and HIC, keep the full stave in an humidity controlled environment)

- **Cooling water leaks:**
  - we didn't discuss this in detail but we should plan to use a water leak-less system as in ALICE.
    - the pressure inside the cooling tube is lower than atmospheric such that if you have a failure you do not spill water outside but instead you'll suck air inside the tubes.
  - in vacuum even if we'll have a lower-than-atmospheric pressure inside the tube, we'll still spill water in the system in case of a leak

- **Buckling:**
  - in ALICE the pipes are subjected to a pressure from outside to inside, leading to possible buckling of the Kapton pipe wall.
  - in case of operation in vacuum the pressure will be from inside to outside (no buckling, better)
  - the tubes have been tested up to 50 bar

- **Feedthrough(s)**
  - will need at least 4 customised feedthroughs from each side of the tracker
    - each stave has 1 readout + 2 power flex flat cables + cooling I/O
    - staves are bundled in pairs together (along one layer)



- **Movability**: only when chamber is open since we ditched the remotely-controlled hexapod idea

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