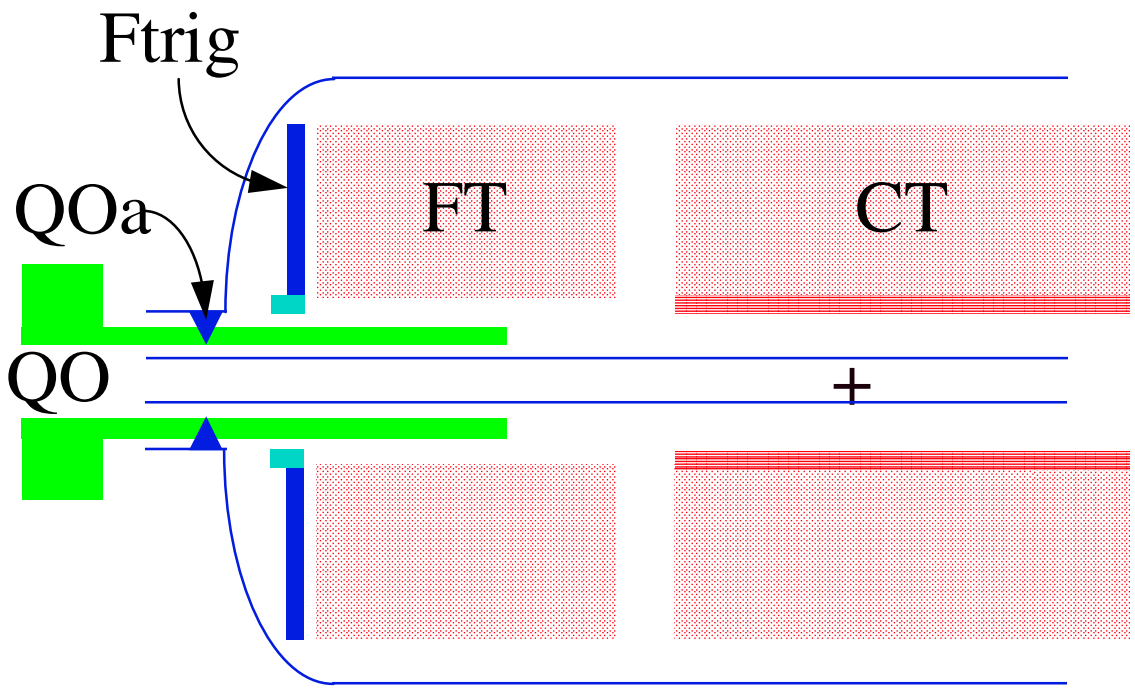
FTD and support for QO

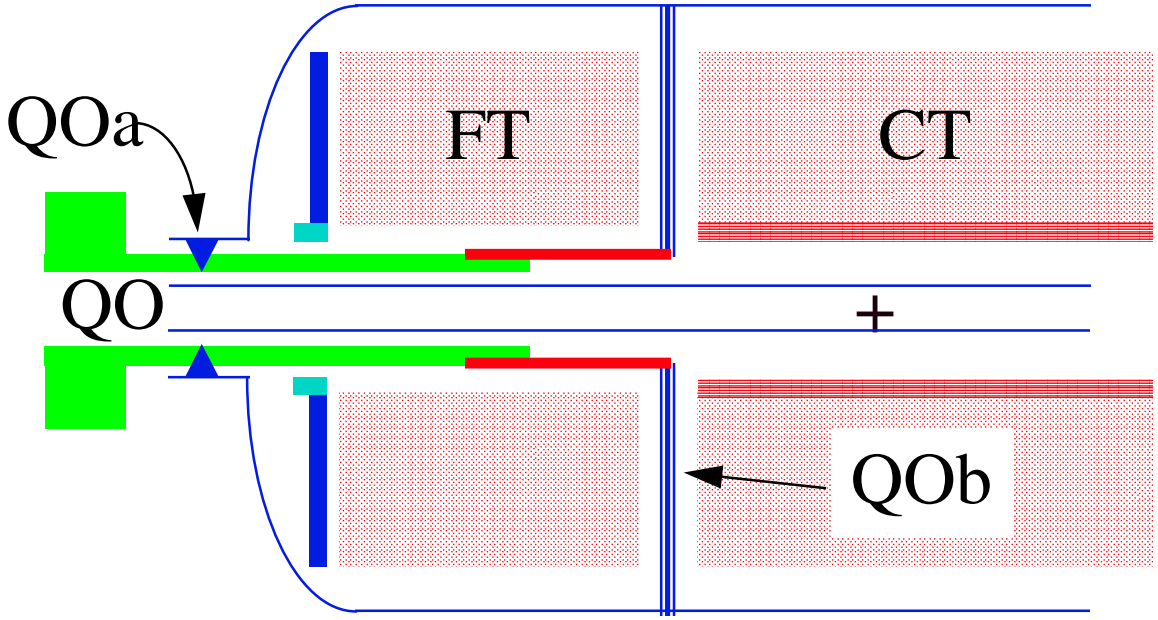
- Must support QO within H1.



- Forces due to weight ± magnetic force (QO dipole in H1 solenoid field) ~ (1 ± 3.7)kN ($e^- \Rightarrow \uparrow$, $e^+ \Rightarrow \downarrow$).

FTD and support for QO cont.

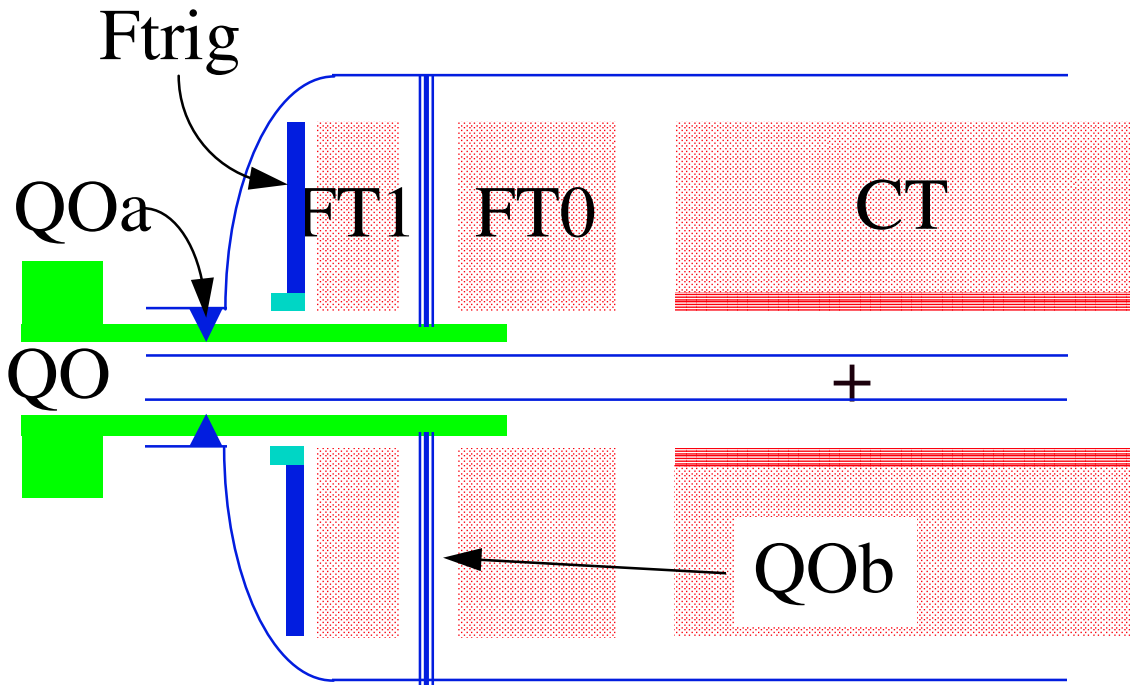
- Original proposal



- Cryostat deflection due to magnet weight ± magnetic forces ~ (0.2 ± 0.6)mm.
- Problems:
  - Tube inside FTD ~ 6mm stainless steel, causes showering.
- Look for alternatives.

Split FTD, take 1

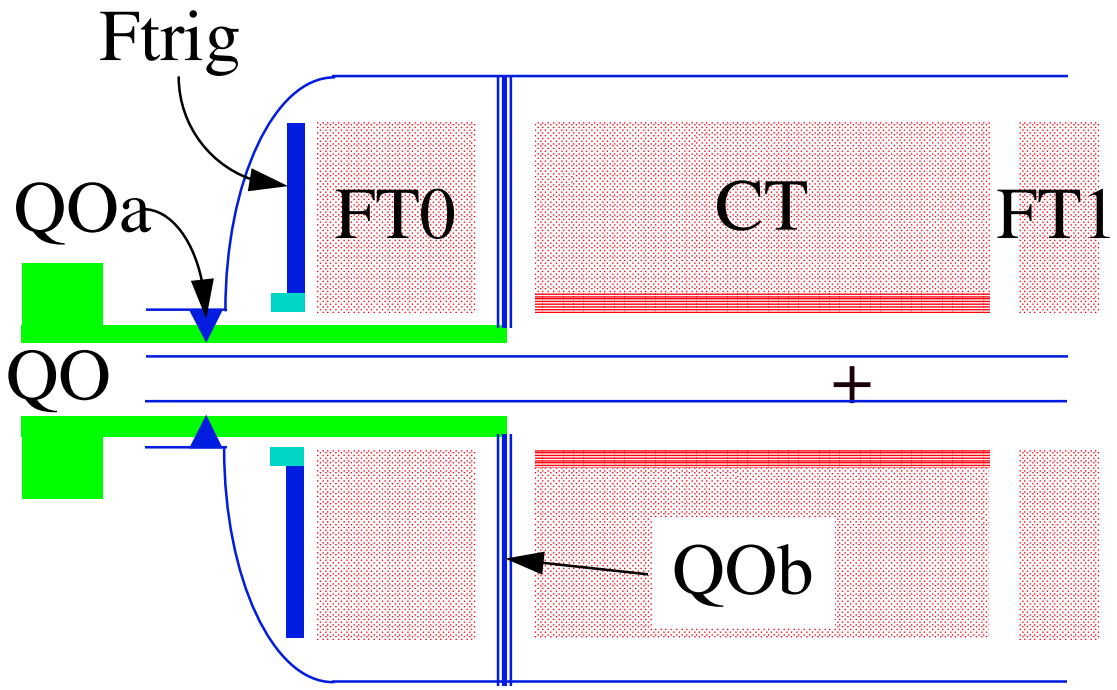
- Separate SM1 and SM2, remove radial, support QO between SM1 and SM2.



- Problems:
  - Pattern recognition in FTD (must extrapolate across longer region without measurement).
  - FTD alignment (FT0/FT1 less mechanically stable).
  - Support must be installed with FTD.

Split FTD, take 2

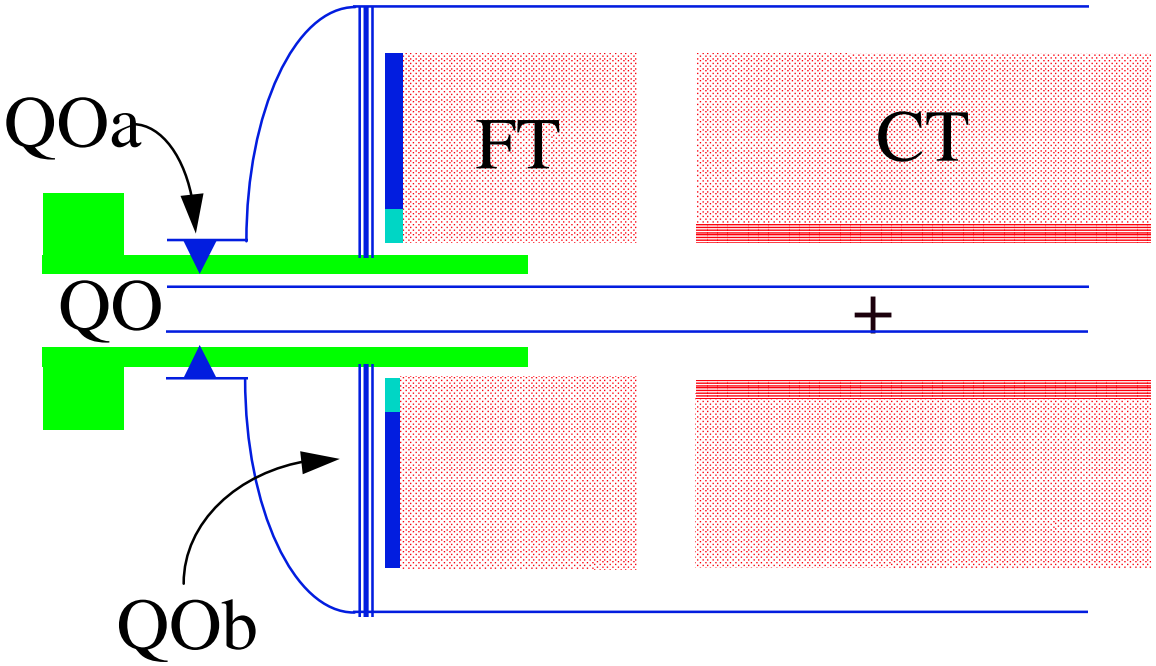
- Use one SM as BDC replacement.



- Problems:
  - All cables must go over FT1 (just possible?).
  - Large change in CIP position, background rejection affected?
  - Track angles in CT.
  - FT/CT track matching.
  - Support must be installed with FTD.

Current favoured solution

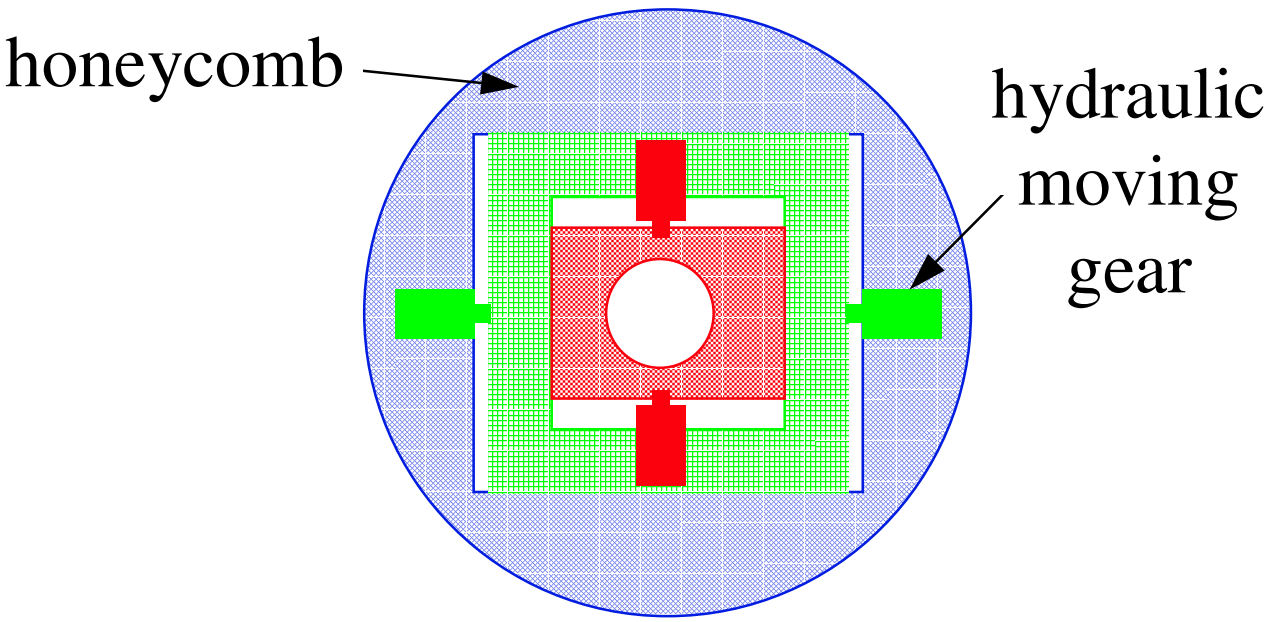
- Remove foremost radial, support QO at front of FTD.



- FTD ends at z ~ 2390mm.
- QOb can be installed independently of FTD, then left in position “for ever”.
- Possible problems:
  - Resulting deflection of cryostat too large?
  - Replacement for BDC?

QOb support

- Schematically, QOb will have structure something like:



Effects on FTD performance

- Removal of one radial provides enough cables/FADCs to equip new planar chambers.
- Keep all 12 wires in remaining two radials (cf. proposal: disconnect 4 wires in each radial).
- Number hits approx. unchanged.
- Momentum resolution slightly worse:
  - Nominally, for vertex fitted tracks $\frac{\sigma_p}{p^2} = 0.0030.$
  - Becomes $\frac{\sigma_p}{p^2} = 0.0036.$
- Pattern recognition unaffected.