FORMOSA position discussion

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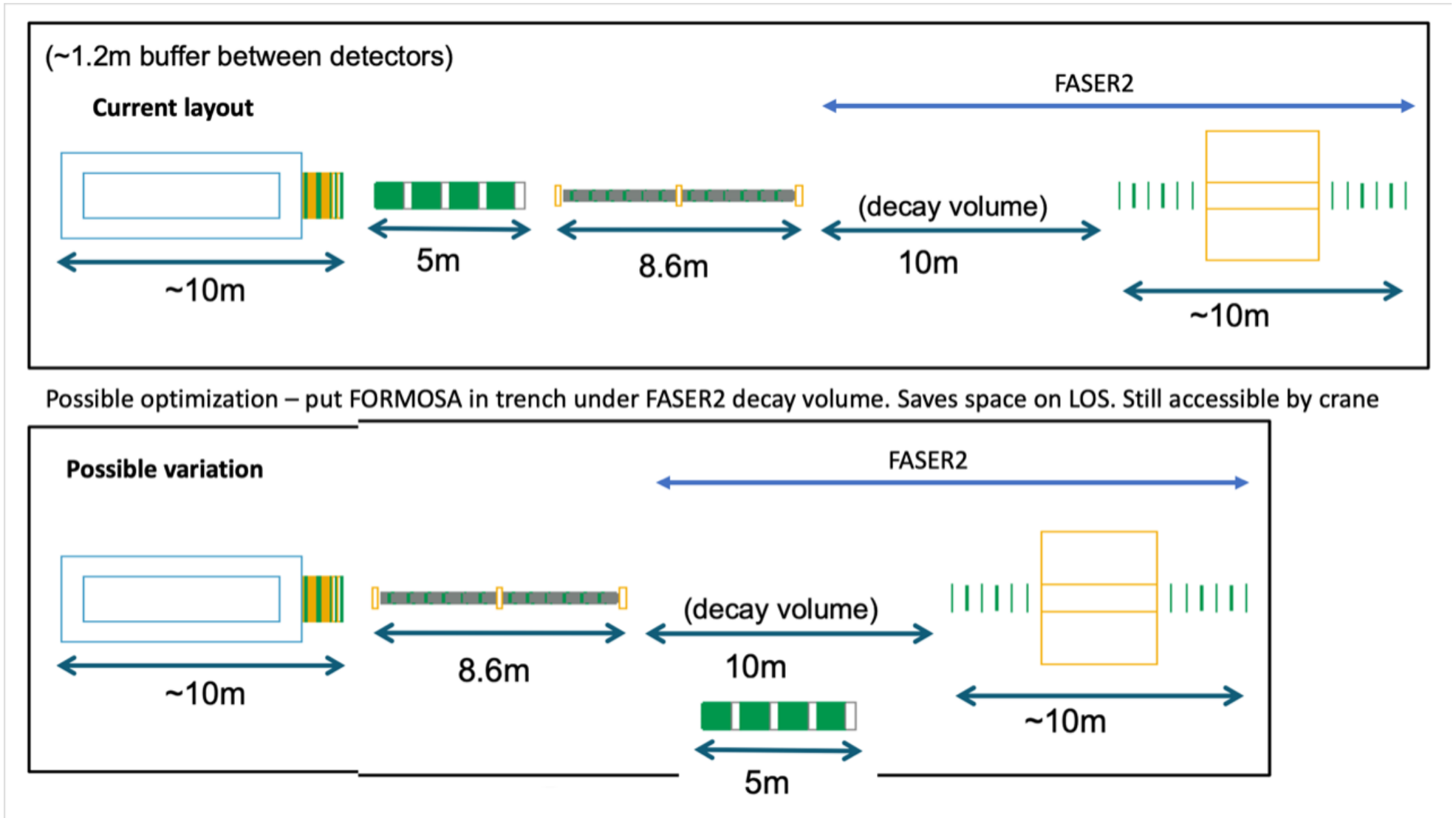
Proposal to be discussed: reposition FORMOSA

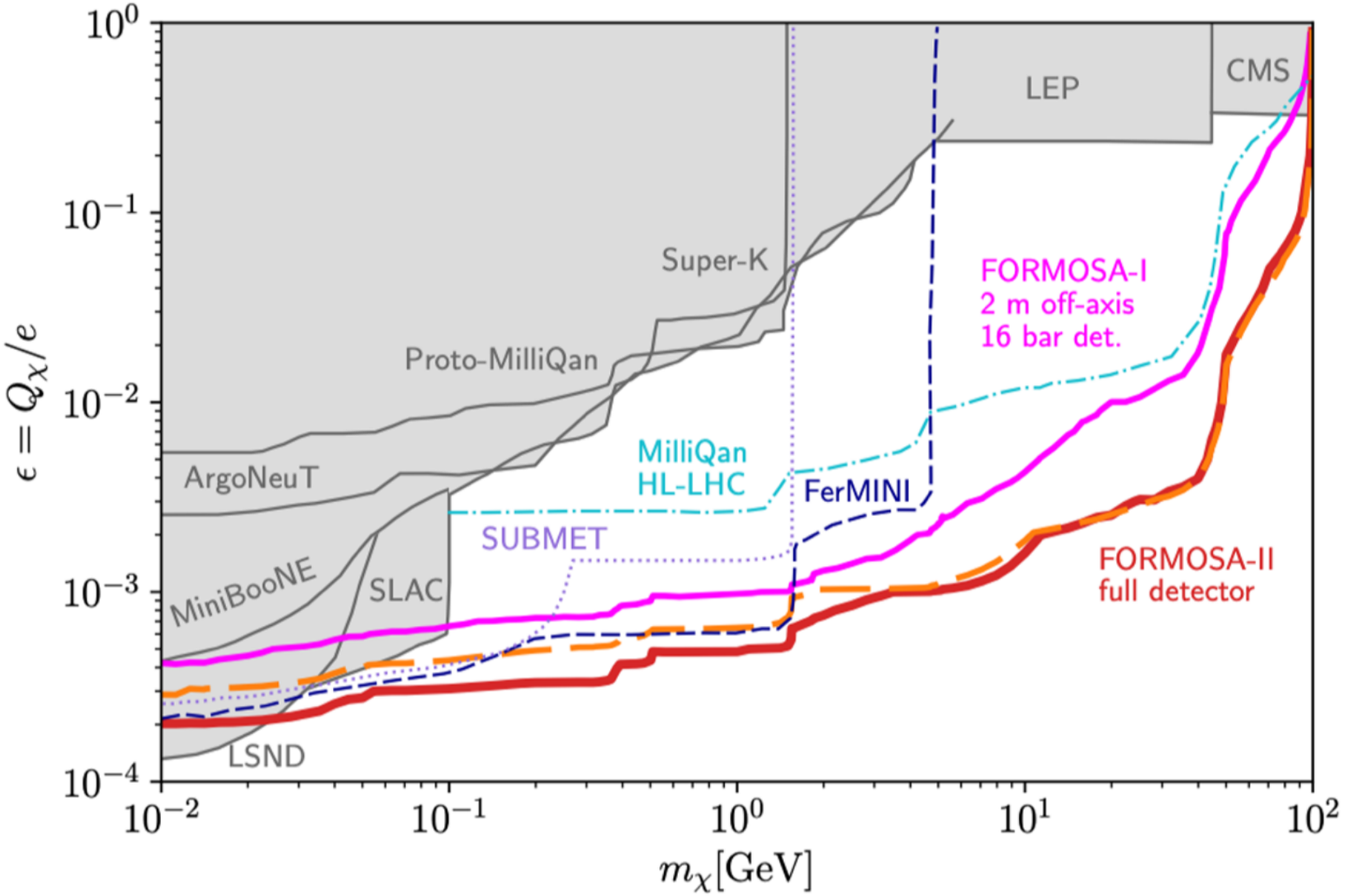


Possible optimization – put FORMOSA in trench under FASER2 decay volume. Saves space on LOS. Still accessible by crane

Benefits: save space in cavern (what is cost/time saving?)

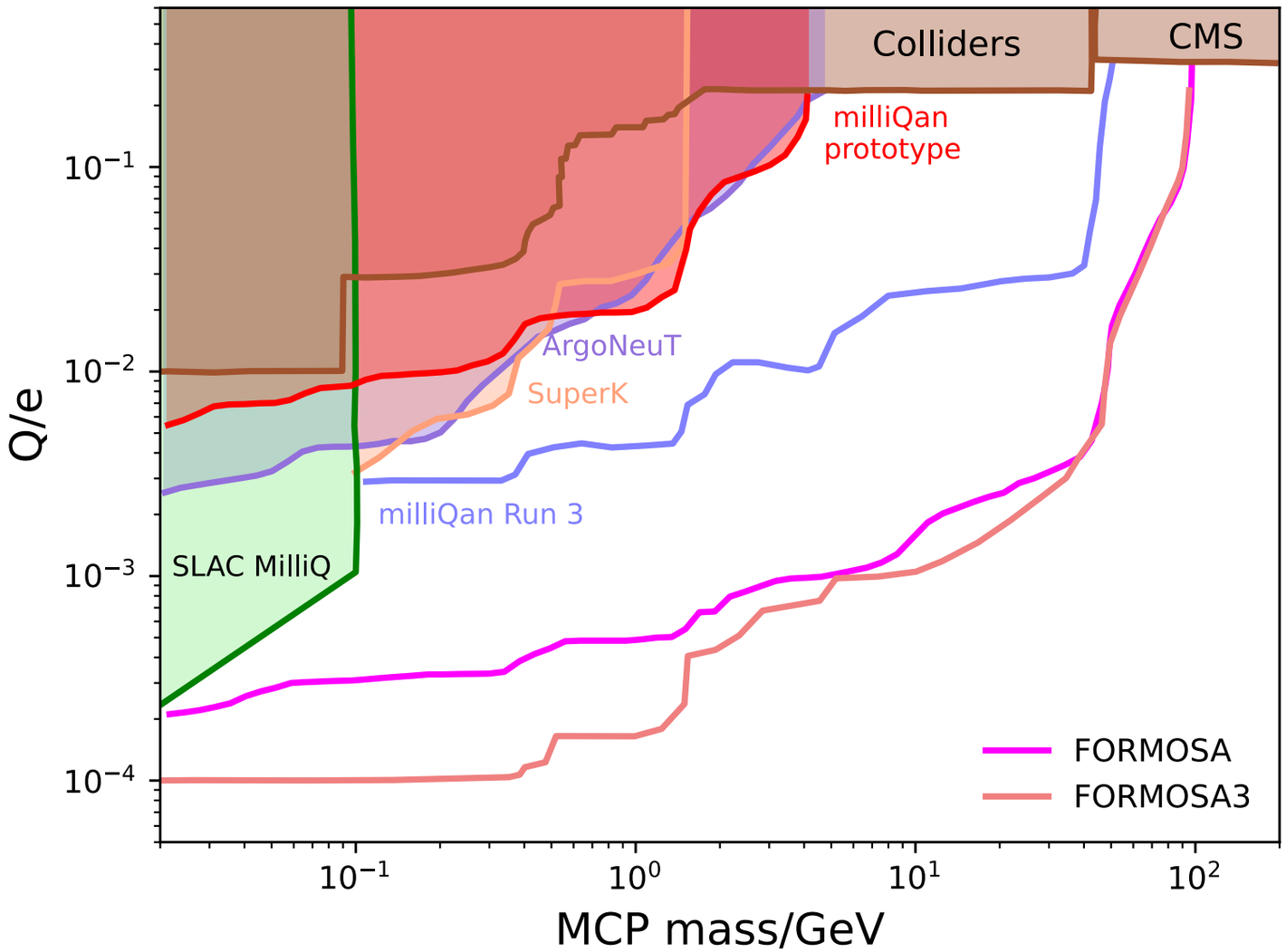
potential additional cosmic veto from FASER 2?

What do we lose? - direct sensitivity



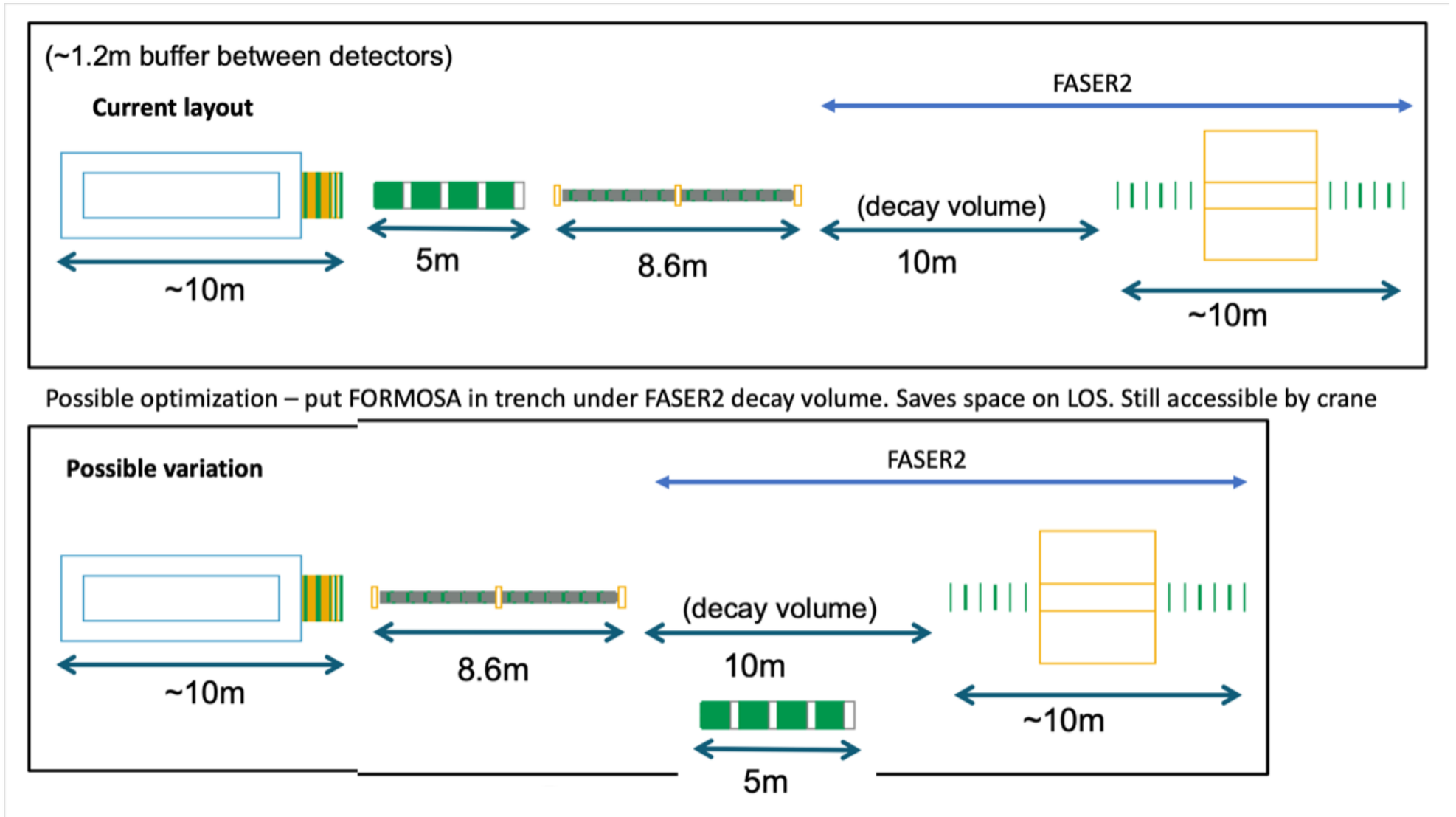
- Off axis position has lower signal flux
  - NB: smaller impact than shown as this is 2m while offset position 1m
- Not huge on log-log scale but appears up to ~ 50% worse in charge reach for low masses
- What is the impact on background?

What do we lose? - FLARE complementarity



- The orange line shows what could be achieved with a 3 layer detector **for same zero background** as 4 layers (up to factor 2 increase in sensitivity)
- This is only feasible if we either split the detector (complex and own issues) or make use of overlap with FLArE for one of the deposits
- Could be other gains from detector overlaps - use FORMOSA as calo?

What do we lose? - access

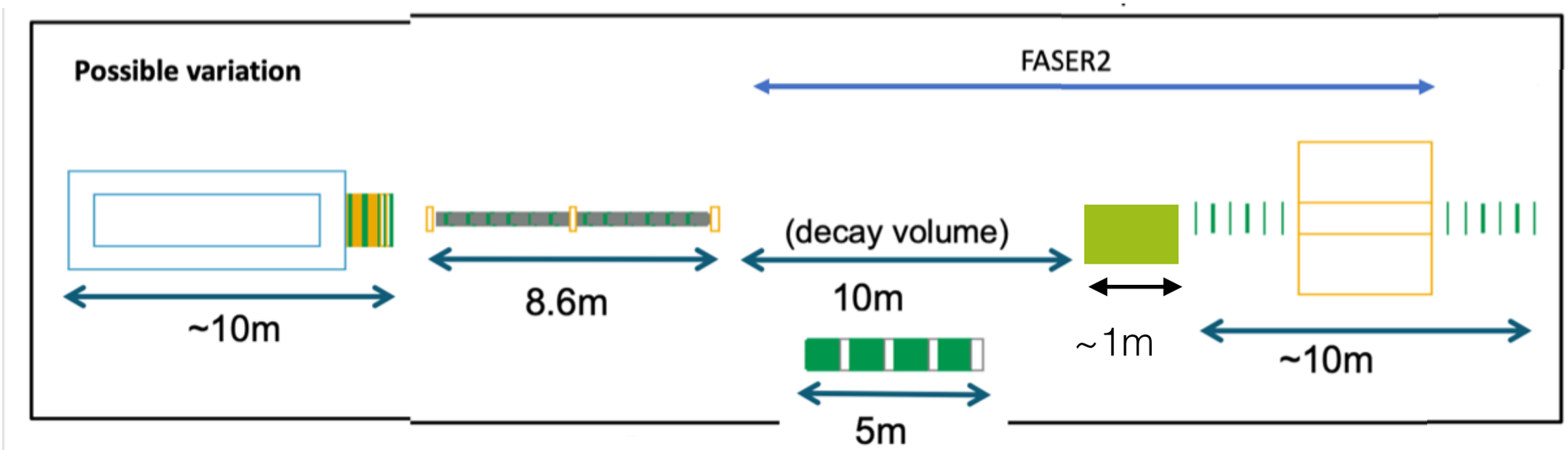


How easy is this position to access after FASER 2 installed?

Possible compromise

Using CeBr provides: higher light yield for lower length, maintaining complementarity with FLArE

NB: must be **in addition** to regular FORMOSA (off axis fine) to maintain high mass sensitivity



Compact crystal FORMOSA

e.g. 4 layers of 2x2 ~20cm scintillator provides ~6 times light yield of 1m plastic bars

Suggestion: plan for full FORMOSA off axis but maintain ~1m on axis for CCF