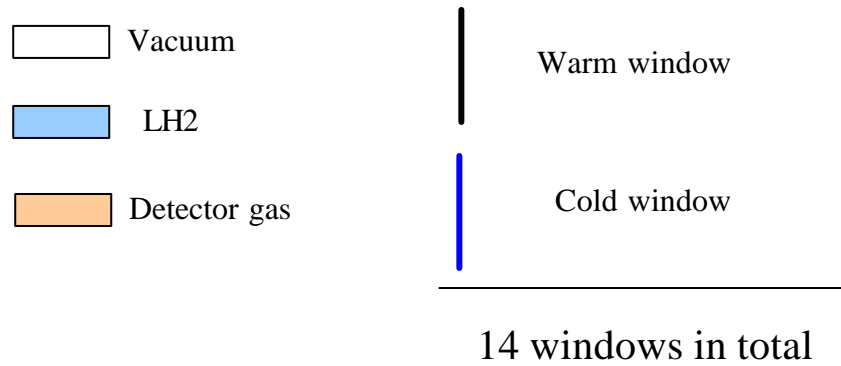
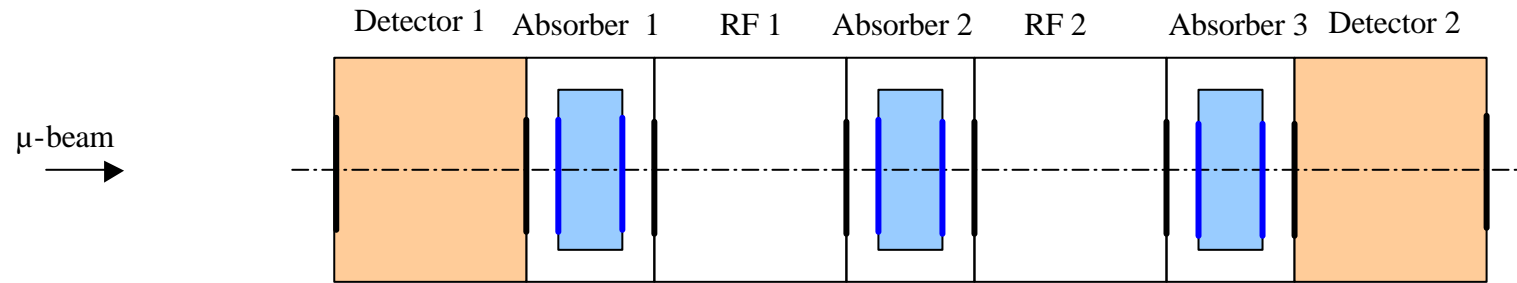


Windows in MICE: Option 1 (as currently designed)



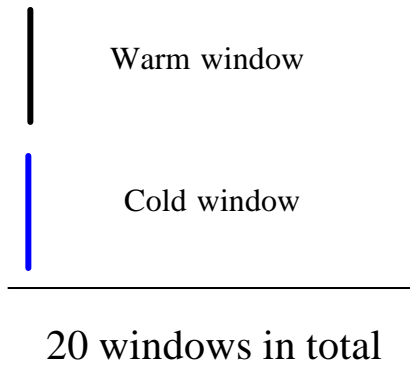
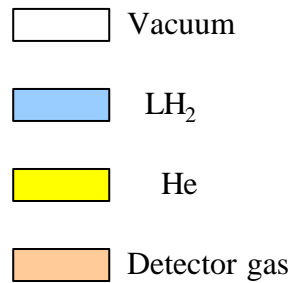
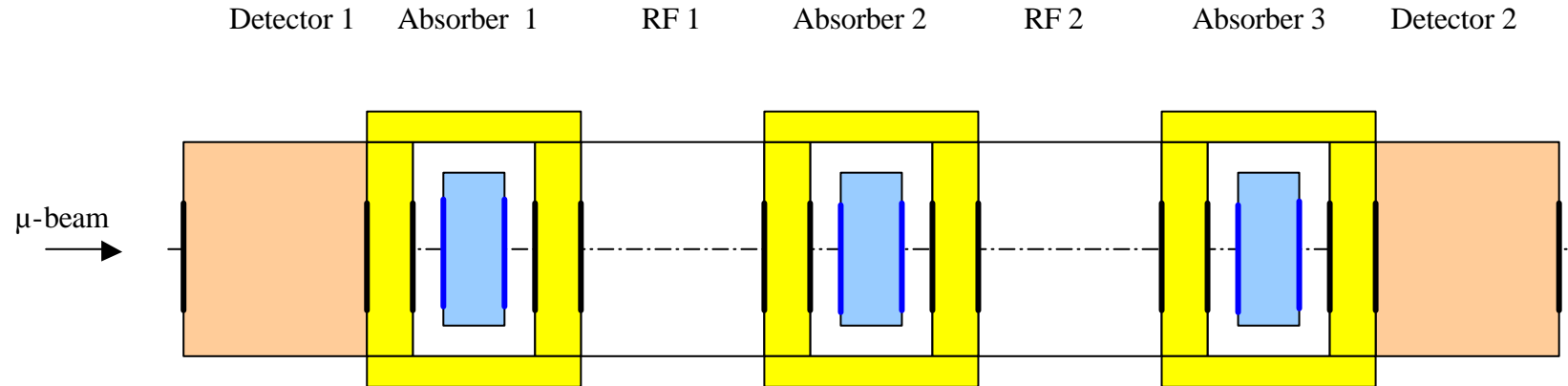
ISIS Safety officer's comment:

If absorber vacuum cryostat leaks, air is cryo-pumped and condensed on the LH₂ cold window and other cold surfaces. Then if LH₂ window leaks or breaks, hydrogen is in direct contact with oxygen.

Double-fault-scenario safe concept must be implemented !

Windows in MICE : Option 2

Is it what we need from the LH2 safety point of view?



RAL's comment:

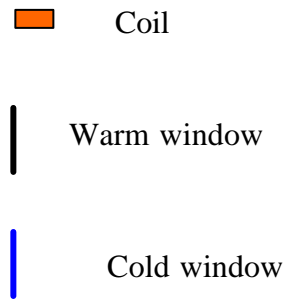
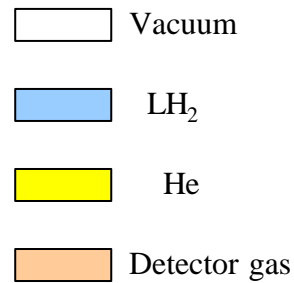
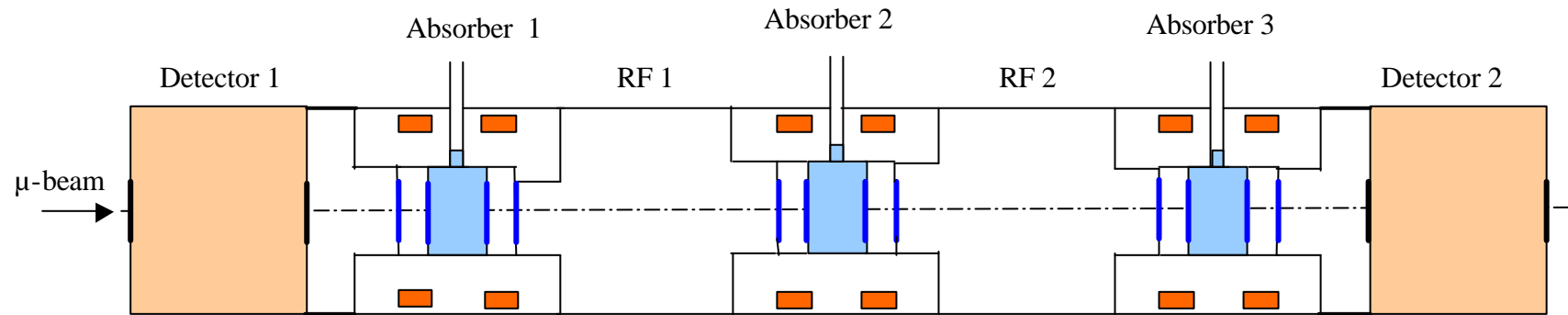
This scheme is the closest one to the design of RAL hydrogen moderators which have been approved by RAL/ISIS Safety officers.

Questions remain to be answered:

1) if the LH₂ window breaks and a jet of cold hydrogen touches the intermediate safety window which is warm, how does the latter one behave?

2) Heat transfer between the intermediate and the internal windows.

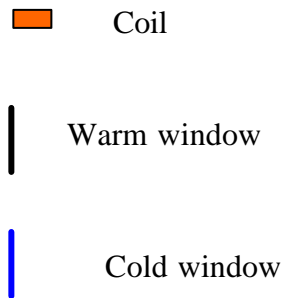
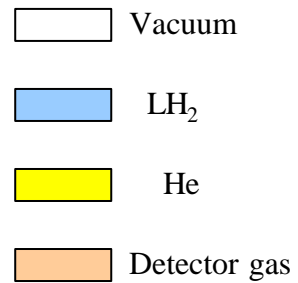
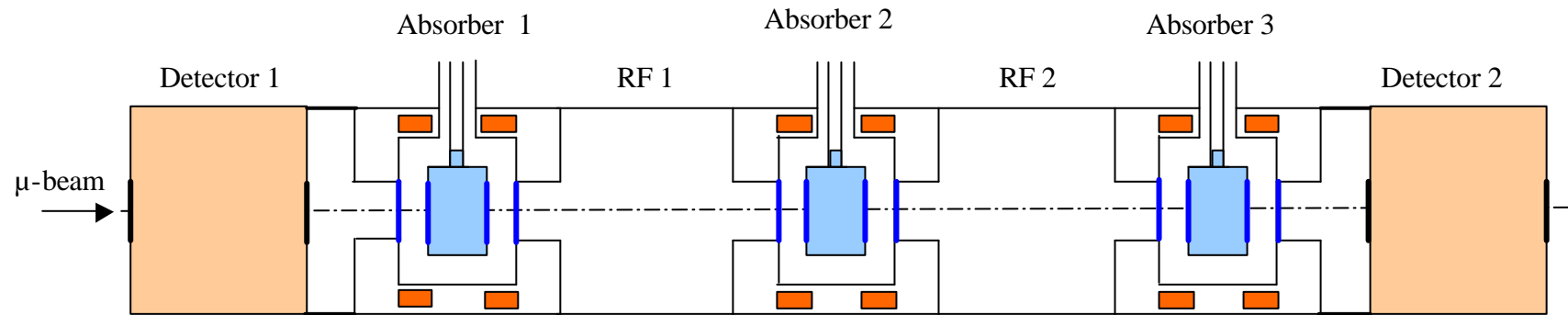
Windows in MICE : Option 3.0



The idea behind this approach is to separate the flip-coils cryostat vacuum and LH₂ absorber vacuum (thus providing an extra jacket for LH₂) and to keep LH₂ safety window relatively cold (thus eliminating question/problem from scheme 2) without increasing number of windows.

16 windows in total

Windows in MICE : Option 3.1

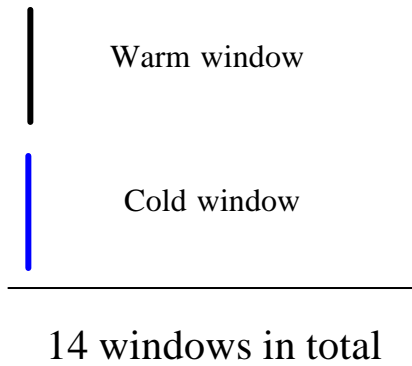
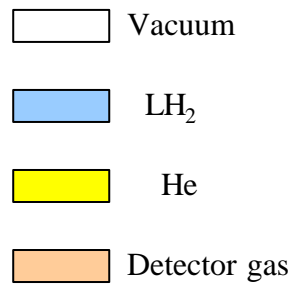
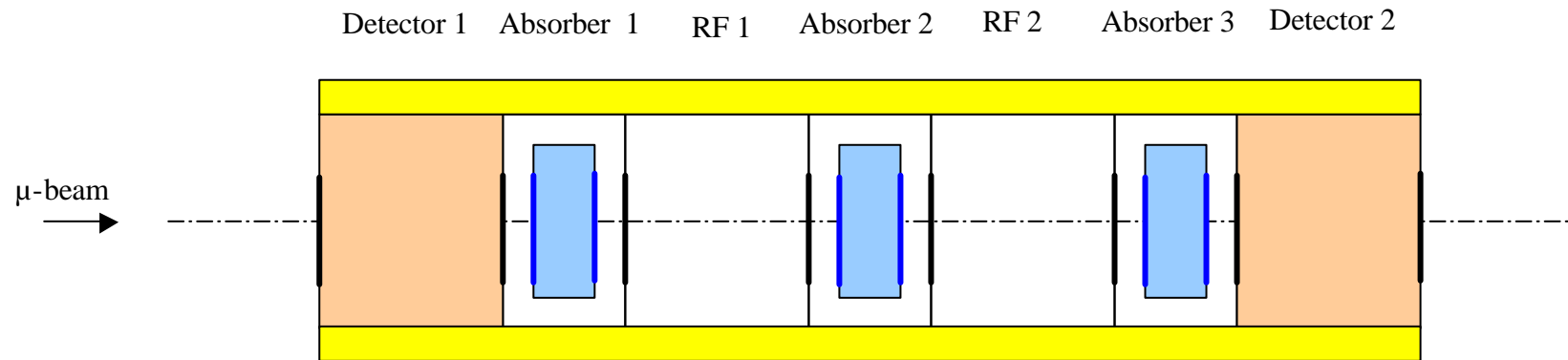


This is a modified version 3 in which the flip coils vacuum volume is completely separated from the LH₂ volume.

As a result, the LH₂ is separated from the external air by a 2-surface barrier everywhere.

16 windows in total

Windows in MICE : Option 4



In this scheme there is no path for air into LH₂ vacuum volume.

But taking into account all the feed-throughs to be made, is it possible to achieve this concept in a real system?

Safety window to the detector must be warm if detector is at atmosphere pressure. Safety window to the RF could be cold but dual system is not so desirable. Leakage of H₂ into RF vacuum is a question.