

DR/BDS/DUMP group meeting (07/12)

Attendees : Angeles Faus-Golfe, Thomas Markiewicz, Toshiyuki Okugi, David Rubin, Peter Sievers, Ben Shepheard, Nobuhiro Terunuma, Kaoru Yokoya, Mikhail Zobov

✓ ***Introduction of the snowmass presentation for Higgs factory (by Angeles Faus-Golfe)***

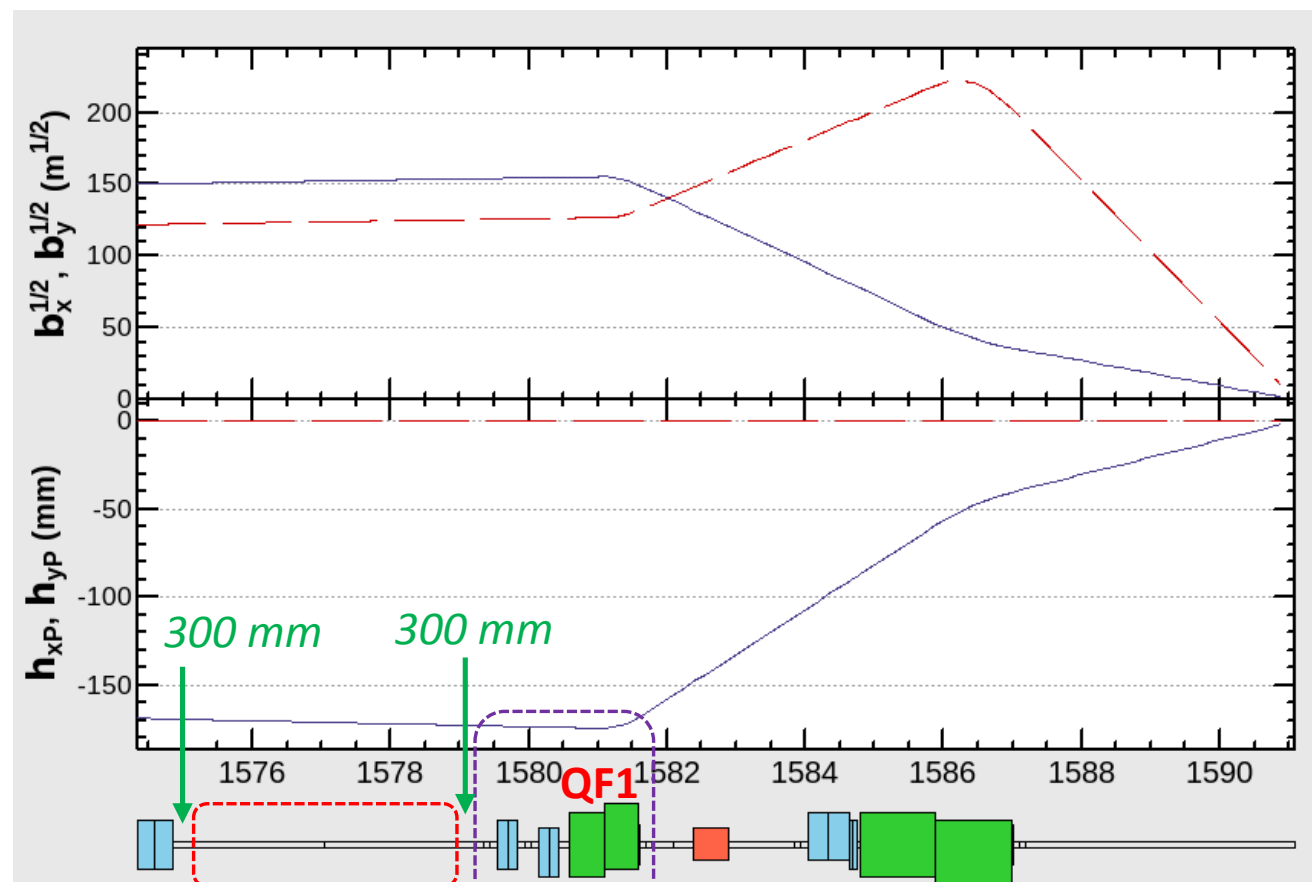
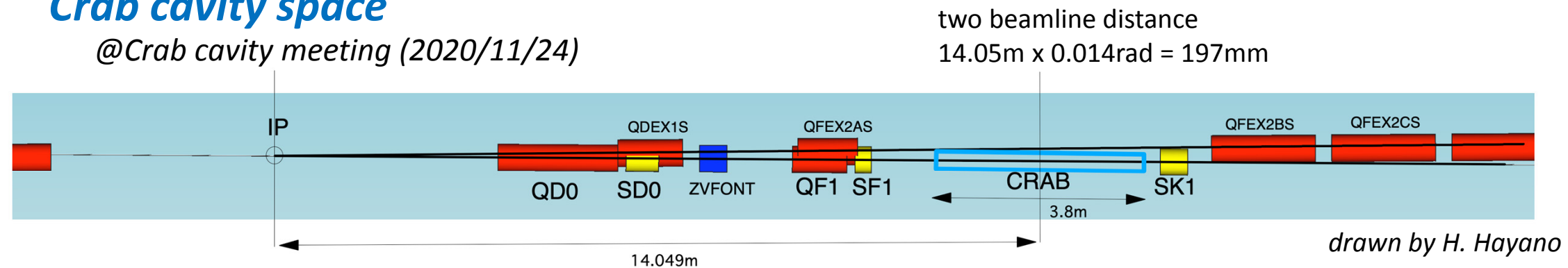
Boundary of BDS group and Crab cavity group

2022/07/26
Toshiyuki OKUGI, KEK
IDT WG2 meeting

Exact length of the crab cavity space

Crab cavity space

@Crab cavity meeting (2020/11/24)



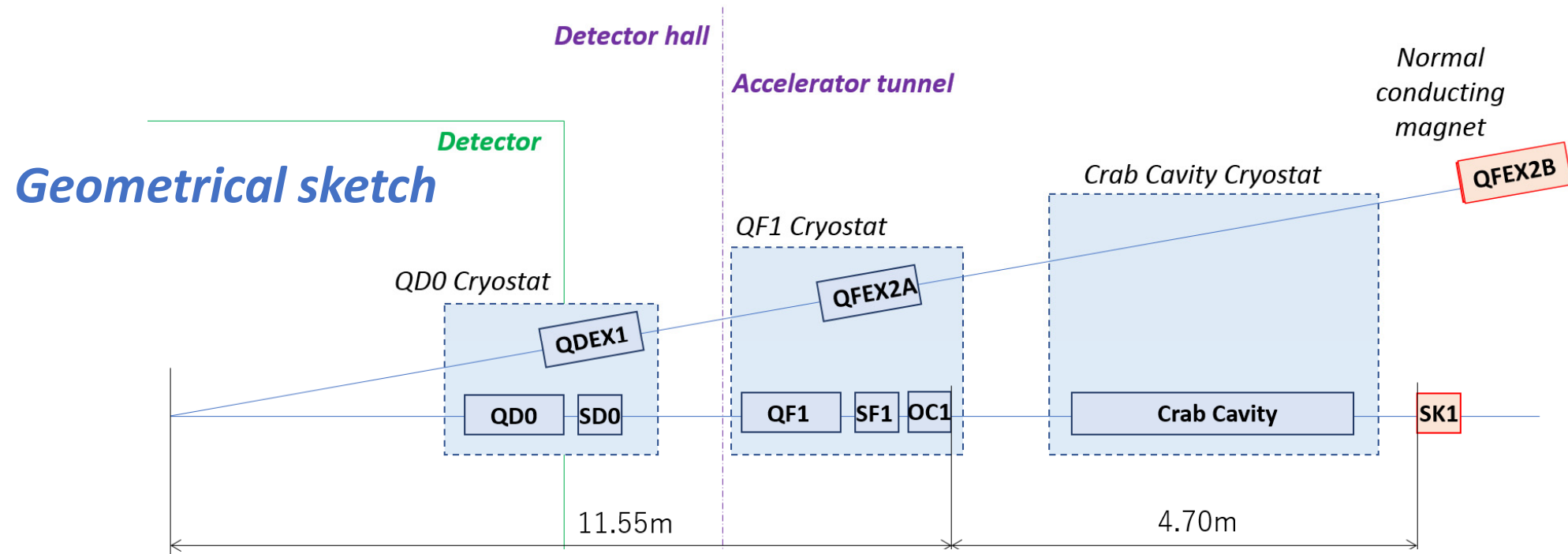
Space for C.C.
3800 mm

Space for QF1 cryomodule package

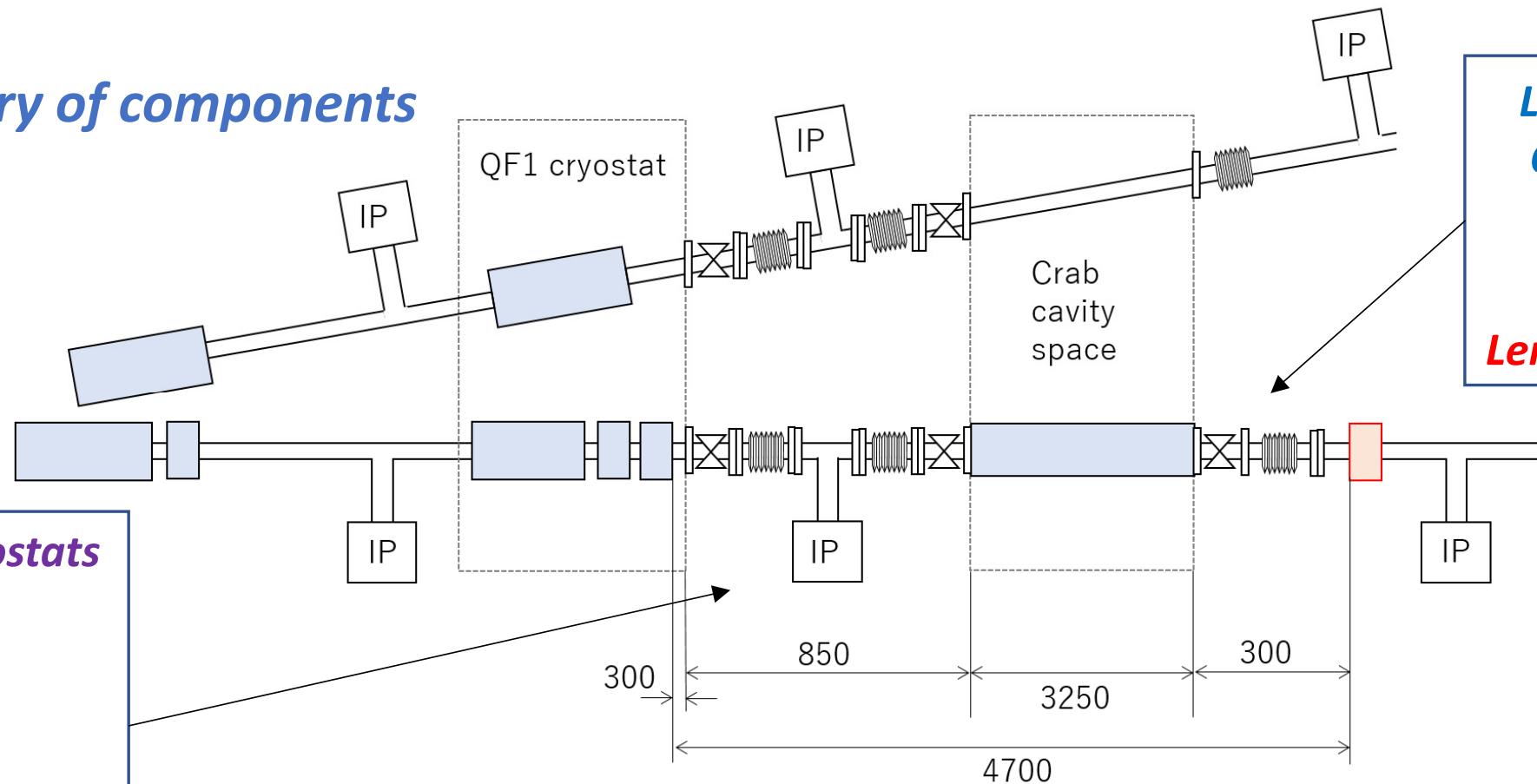
Length between OC1 end to QF1 cryomostat end plate : 300 mm

- Although it is not included in the figure above, there is actually an octupole called OC1 between SF1 and the crab cavity. The magnet including OC1 is included in the QF1 cryostat package.
- In the present optics deck, **the distance from the end of OC1 to the end plate of the QF1 cryostat is 300mm**, and the space from there to the space of the crab cavity is also assumed to be 300mm.
- The distance from the space of the crab cavity to SK1 is also 300mm.
- Some ideas have been proposed, such as winding OC1 on top of SF1, but all present optics designs are based on the assumption of independent coils. The QF1 cryostat has possibility to be shortened in future, but we would like to consider it based on this drawing for now.

Discussion at the BDS/Crab cavity joint meeting (2022/02/16)



Boundary of components



**Length between
C.C. cryostat end plate to SK1**

- 1 vacuum valve
- 1 bellows

Length of warm section : 300 mm

Warm section in between cryostats

- 4 vacuum valves
- 2 bellows
- 2 vacuum pumps

Length of warm section : 850 mm

After the joint meeting

Comments from crab cavity group

- More detailed delineation of boundaries is needed.
- What kind of devices will fit in either side? For example, vacuum valves on both sides of the cavity should be included in the Crab cavity device in order to protect the Crab cavity.

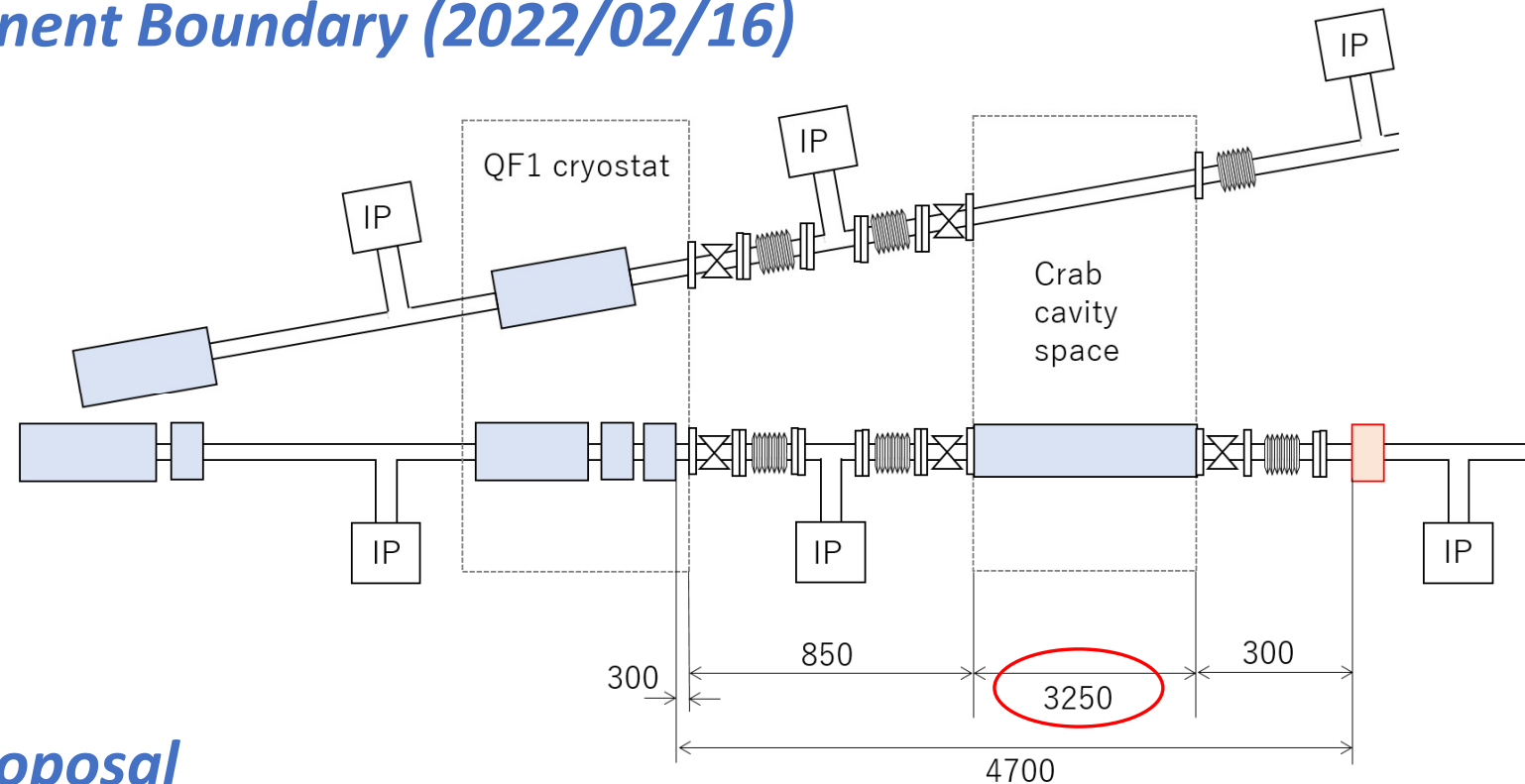
Private communication with Ohuchi-san (superKEKB SC final focus magnet group)

- SC final focus magnet should not be connected to Crab cavity by cryogenic shield from alignment point of view (A warm section should be placed in between).
- In SuperKEKB's QCS, the pipe itself is at room temperature, and the vacuum valves are not located on both sides of magnet.
- Even if you put in a low-temperature pipe, the boundary should be set to room temperature. We should design the QF1 cryostat by taking account of the thermal shield of the pipe.

General limitation

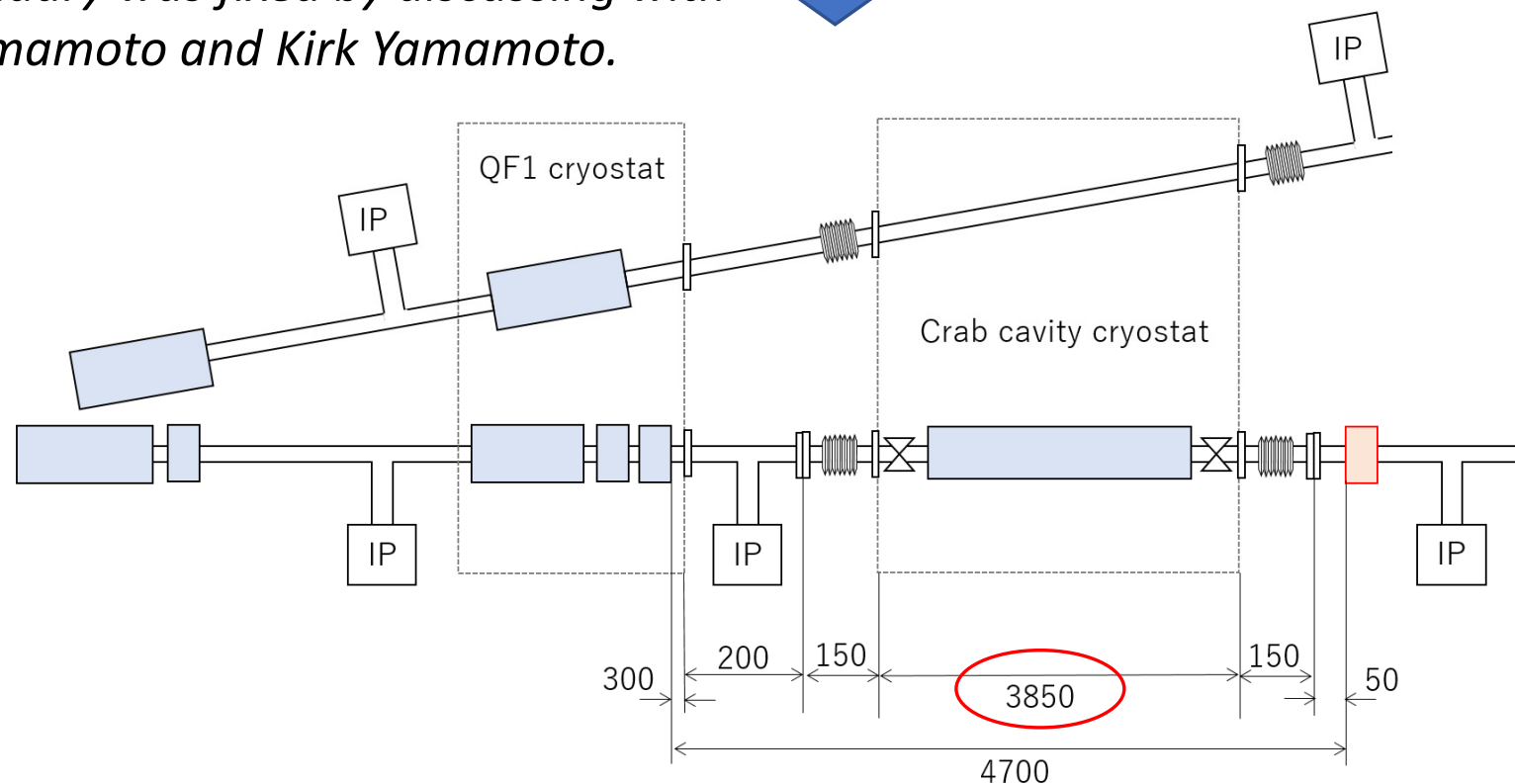
- The limitation of the QF1 cryostat in the longitudinal direction (300mm space between magnet end and cryostat boundary) does not change the requirements of the current optics deck.

Component Boundary (2022/02/16)



New proposal

The boundary was fixed by discussing with Akira Yamamoto and Kirk Yamamoto.



- The boundary of the Crab cavity device is defined as the **“boundary with the warm section”**.
- The space available for the crab cavity has increased from 3250mm to **3850mm**, a 600mm increase.
- However, **it is necessary to convert the vacuum pipe from cold to warm and install a vacuum valve** in that 600mm (300mm on each side).
- If such a facility can be designed shorter than 300 mm per side, the space available for the Crab cavity itself will become longer, and if it becomes longer, it will become shorter.