Status of Cryomodule in KEK

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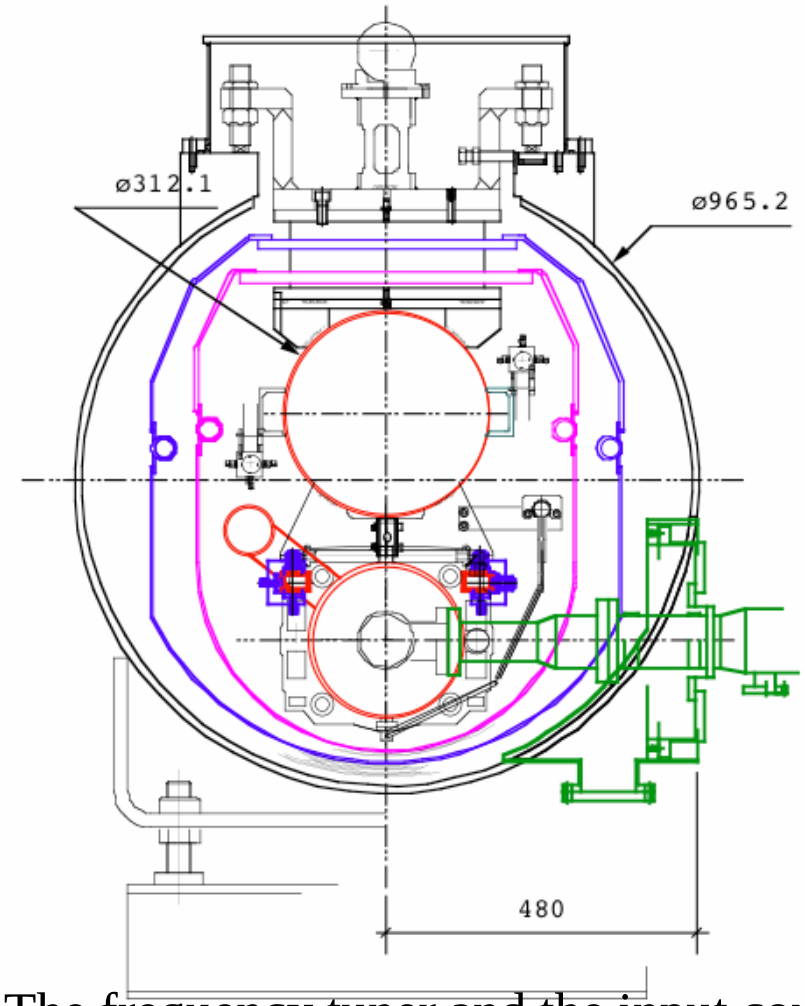
STF-Phase-I Cryomodule

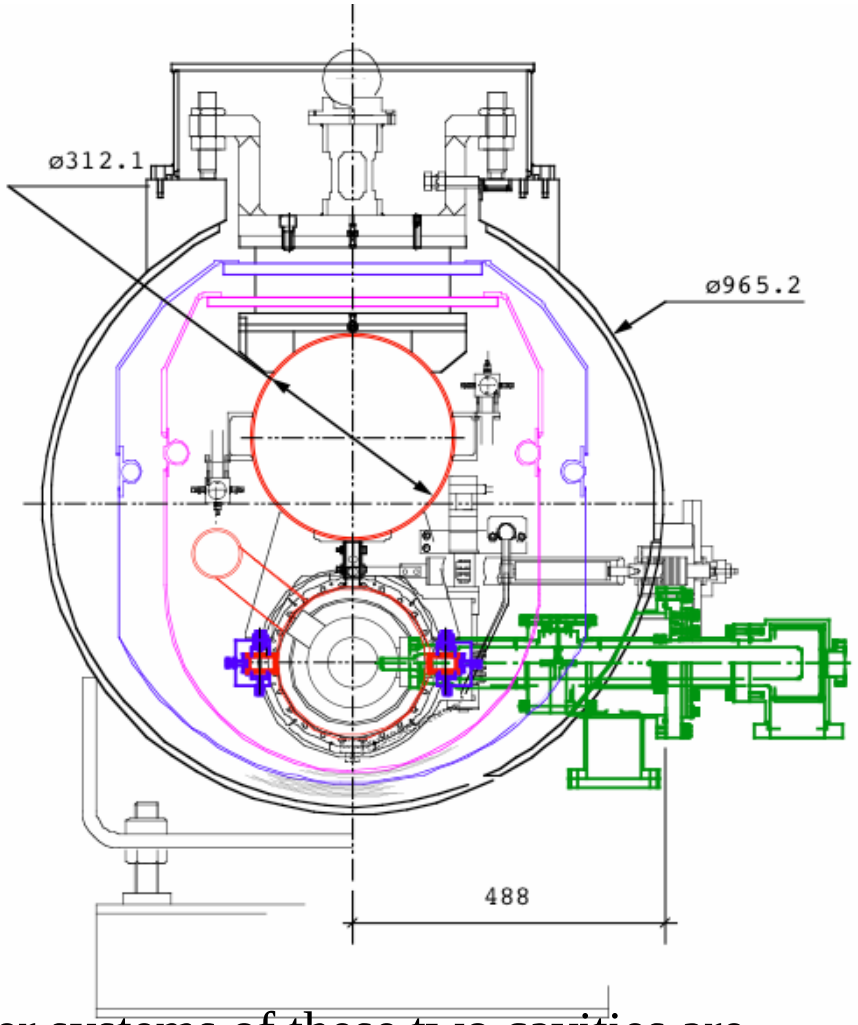
- STF-Phase-I cryomodule design was based on the TTF Type III cryomodule.
- Components of the cryomodule have been manufactured and they have been transported to KEK from Hitachi. Four support posts have been supplied from INFN Milano under the research collaboration. KEK are very appreciate with INFN Milano, Calro Pagani.
- After assembling the cavities into a string, we will start assembling these components into the cryomodule. The assembly will start in October.
- The cold test of the system will begin from January 2007.
  - The heat loads of the components will be measured by this system.
    - The heat loads of the cold mass components, input couplers, HOM couplers, and cavities.
- The first test of the Ti-SUS junction was performed. The junctions for the STF cryomodule is being manufactured and all of them will be tested at 2K.
- 3D-CAD modeling of the STF cryomodule are now being constructed. The model will be used for calculating thermal and mechanical performances.
  - The calculation by ANSYS will be compared with the STF cryomodule test results.
  - After completing the 3D model, we will move to the design of the type IV for the STF Phase II cryomodules.
- The thermal and mechanical data will be acquired from this cryomoule construction and tests for the design of the Type IV cryomodule.

The STF-cryomodule design(1)

Cryomodule for Tesla type cavity

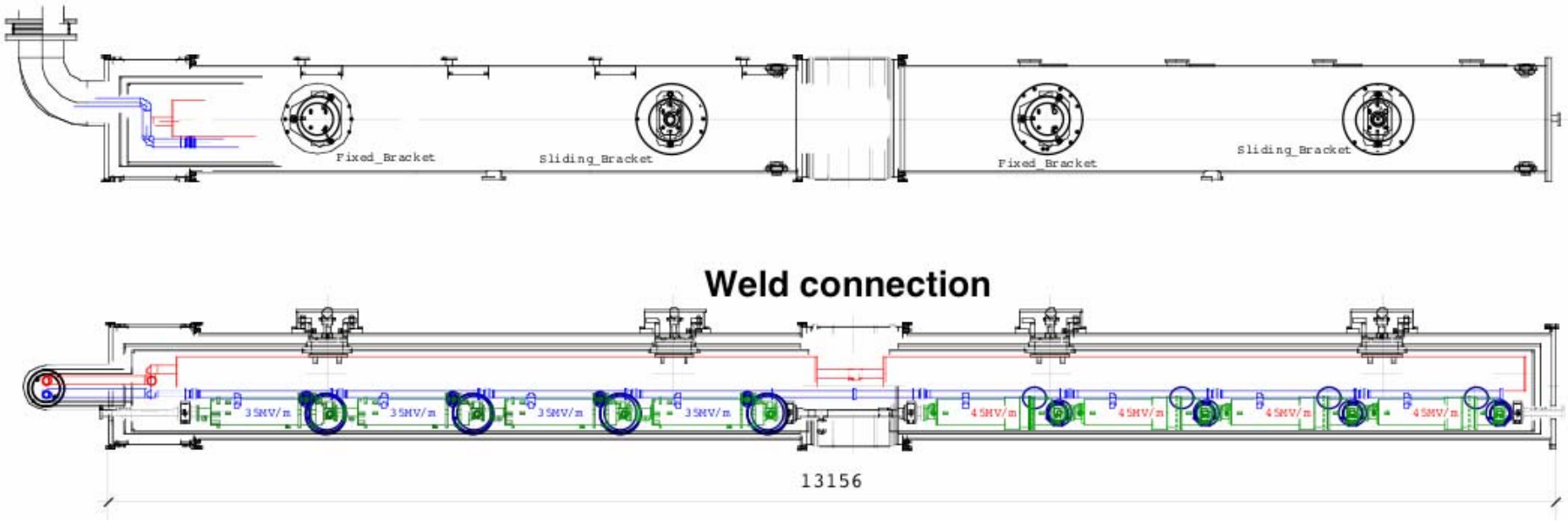


Cryomodule for LL type cavity



The frequency tuner and the input coupler systems of these two cavities are different with each other.

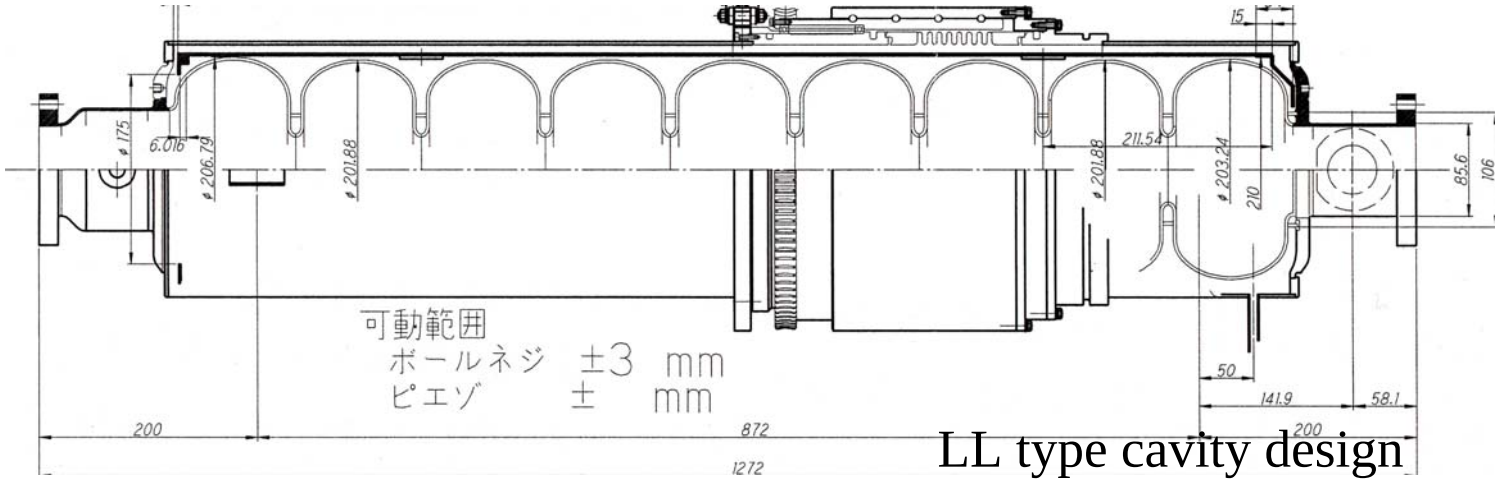
The STF-cryomodule design(2)



- Vacuum vessel length
  - TESLA : 11.385 m, STF : 5.55 + 5.985 = 11.535 m
- Gas return pipe length
  - TESLA : 11.555 m, STF : 5.790 + 5.790 = 11.580 m
  - The STF cryomodule has the connection between two cryostats.
- Support post
  - For each cryostat, cavities are supported with 2 posts, and one is fixed and the other is free in the axial derection.

The STF-cryomodule design(3)

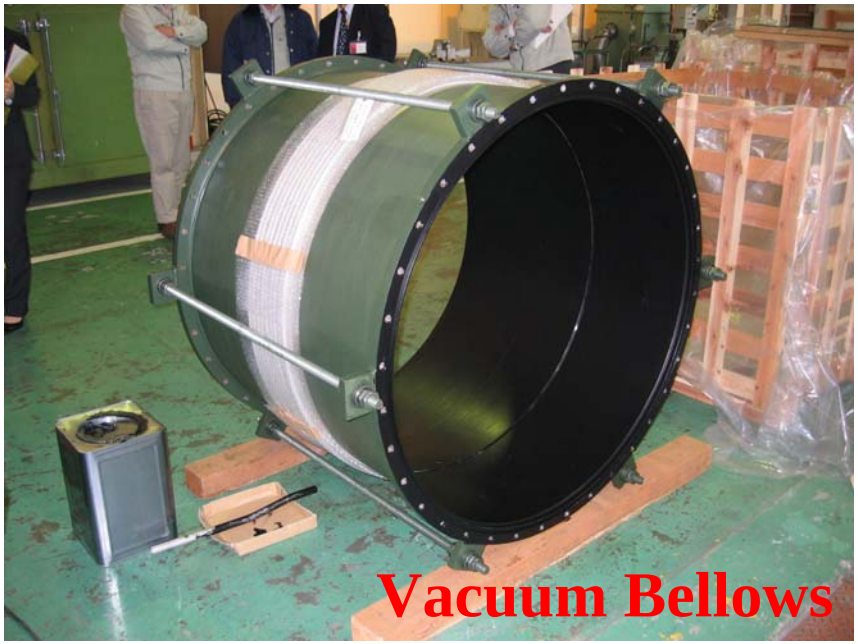
Magnetic shield design



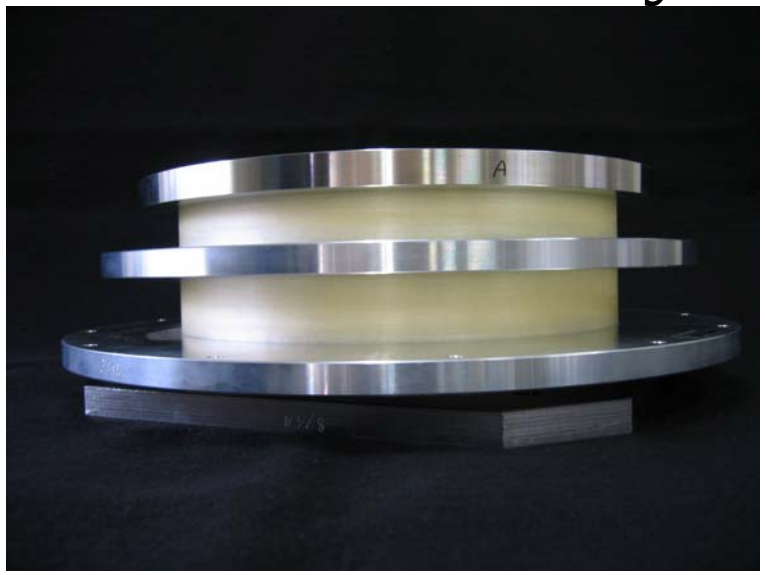
LL type cavity design

- Both Tesla type and LL type cavities have magnetic shields inside the helium jackets.
  - The performance of these system will be comfirmed with the STF cryomodule system.
- These two types of cavities have different tuner system and input coupler.
  - These functions and the thermal performance will be checked and measured, and the heat load will be campared with calculations.

Status of STF cryomodule construction (1)



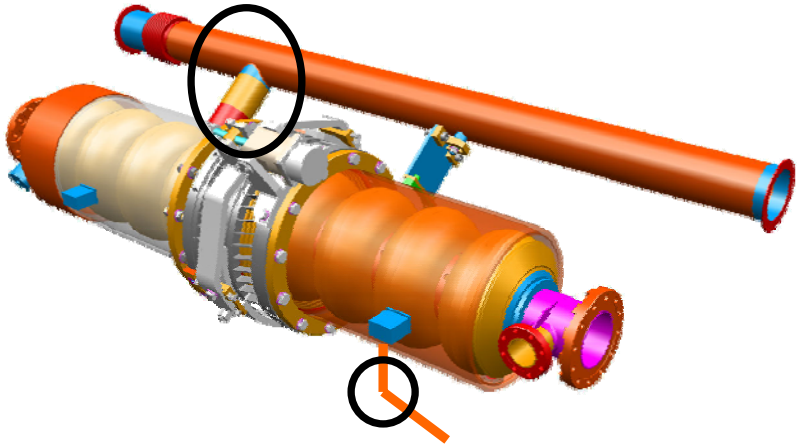
Status of STF cryomodule construction (2)



Support Post from INFN

HIP SUS-Ti junctions

WPM for STF cryomodule



From the presentation by H. Carter

SUS-Ti junction tests

Sample size

- SUS-Ti junctions will be used for the LHe supply pipes and the precooling pipes.
- For making these samples, two methods of hot isostatic pressure (HIP) and friction pressure welding were tried.
- Before the helium leak tests at 2K, the tensile tests at room and LN_2 temperatures were performed.
  - The tensile strength > 480 MPa at room temperature.
  - The tensile strength > 650 MPa at LN_2 temperature.
- Two samples for each manufacturing method had been tested at 2K for superleak.
  - One of two samples experienced thermal shock from room temperature to LN_2 temperature three times before the test at 2K.
  - Four samples showed no helium leak at 2K.
- All junctions which will be used for the STF cryomodule will be tested at 2K.

Friction Welding

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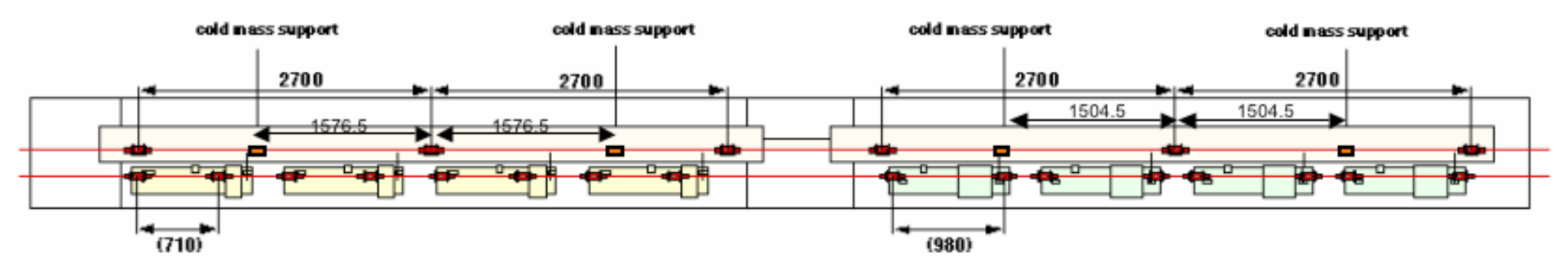
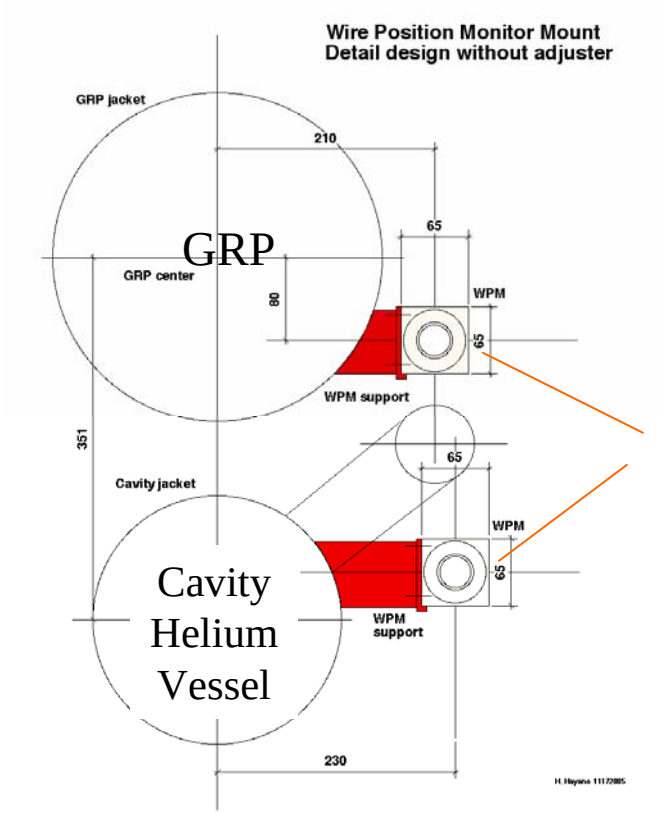
Measurement of the cavity position during cooldown, operation and warmup



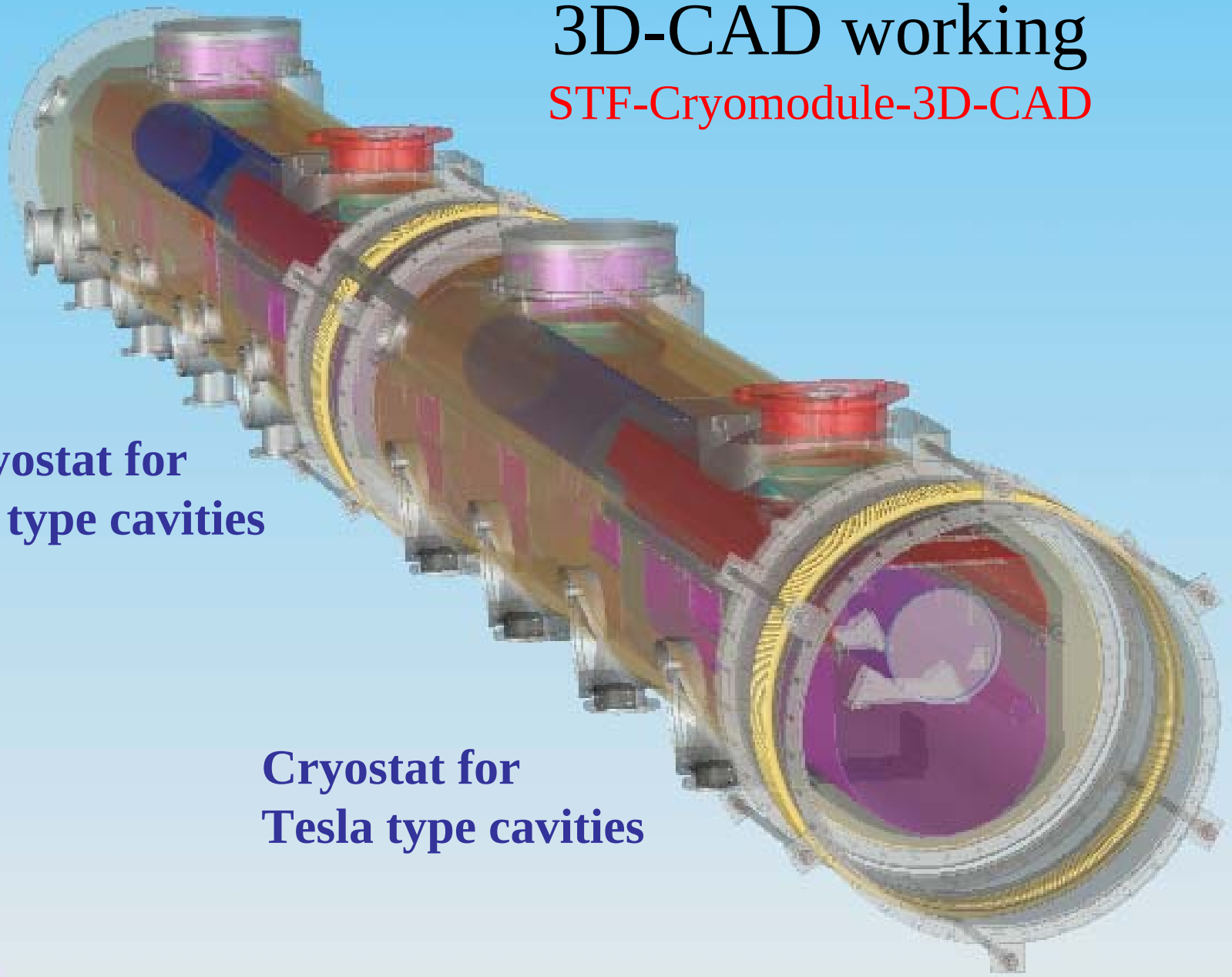


WPM

- Wire Position Monitor (WPM)
  - 5 sensors on GRP for each cryostat
  - 2 sensors for each cavity helium jacket

3D-CAD working

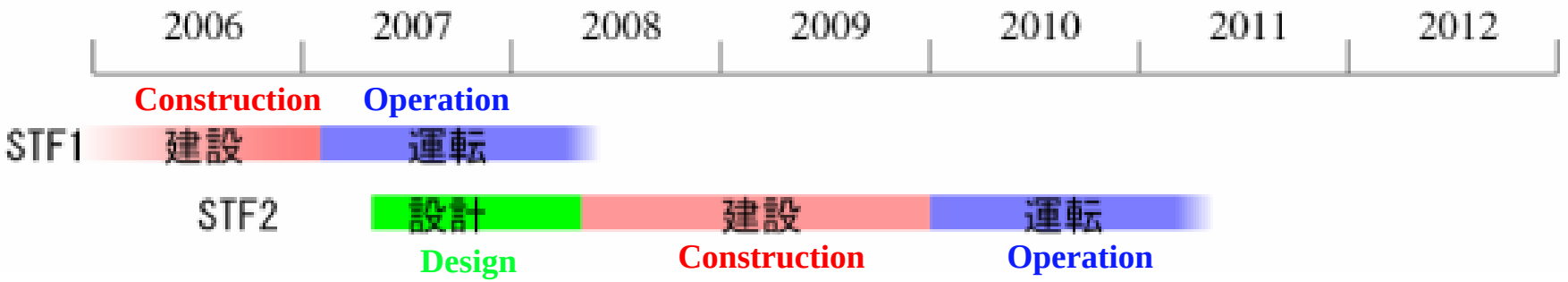
STF-Cryomodule-3D-CAD



Cryostat for
LL type cavities

Cryostat for
Tesla type cavities

STF-Phase-II Cryomodules



- Plan for the STF Phase II
  - Three cryomodules as 1 unit will be constructed for STF-II.
  - These cryomodule should be designed as the Type IV cryomodule.
  - One of them has a quadrupole, correctors and BPM.
  - The design will start from 2007.
- Preparation of designing the Type IV cryomodule
  - Forming the EDMS group in the Asian region.
    - KEK already got the I-deas v.12.
    - Mechanical engineering group has the other 3-D CAD (OneSpace).