

# Input Optics Group

## Current Members

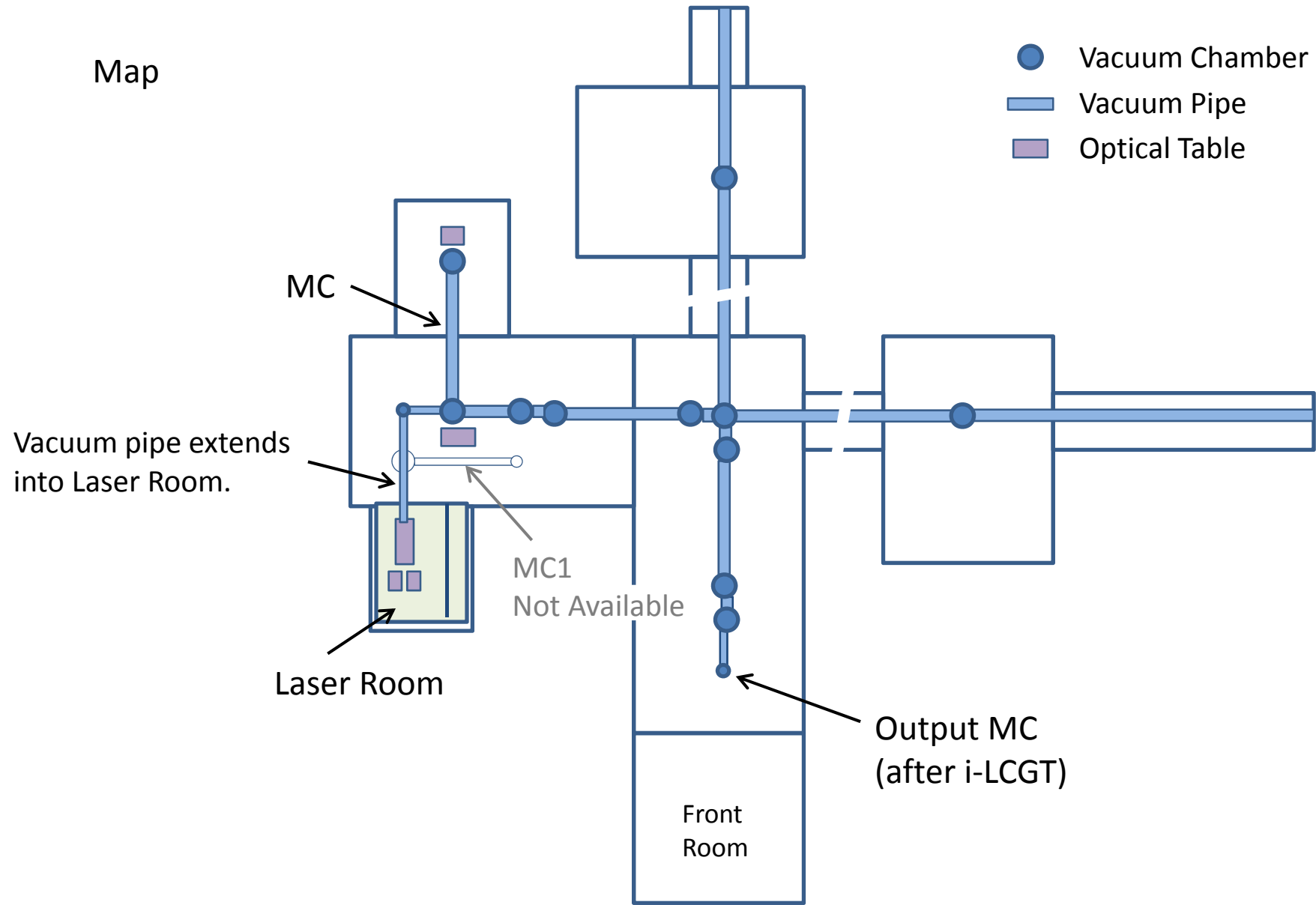
- S. TELADA (AIST)
- S. MIYOKI (ICRR)
- T. UCHIYAMA (ICRR)
- O. MIYAKAWA (ICRR)
- N. MIO (U-Tokyo)
- S. MORIWAKI (U-Tokyo)
- N. OHMAE (U-Tokyo)

Contact: Souichi TELADA <[souichi.telada@aist.go.jp](mailto:souichi.telada@aist.go.jp)>

## Tasks (over view)

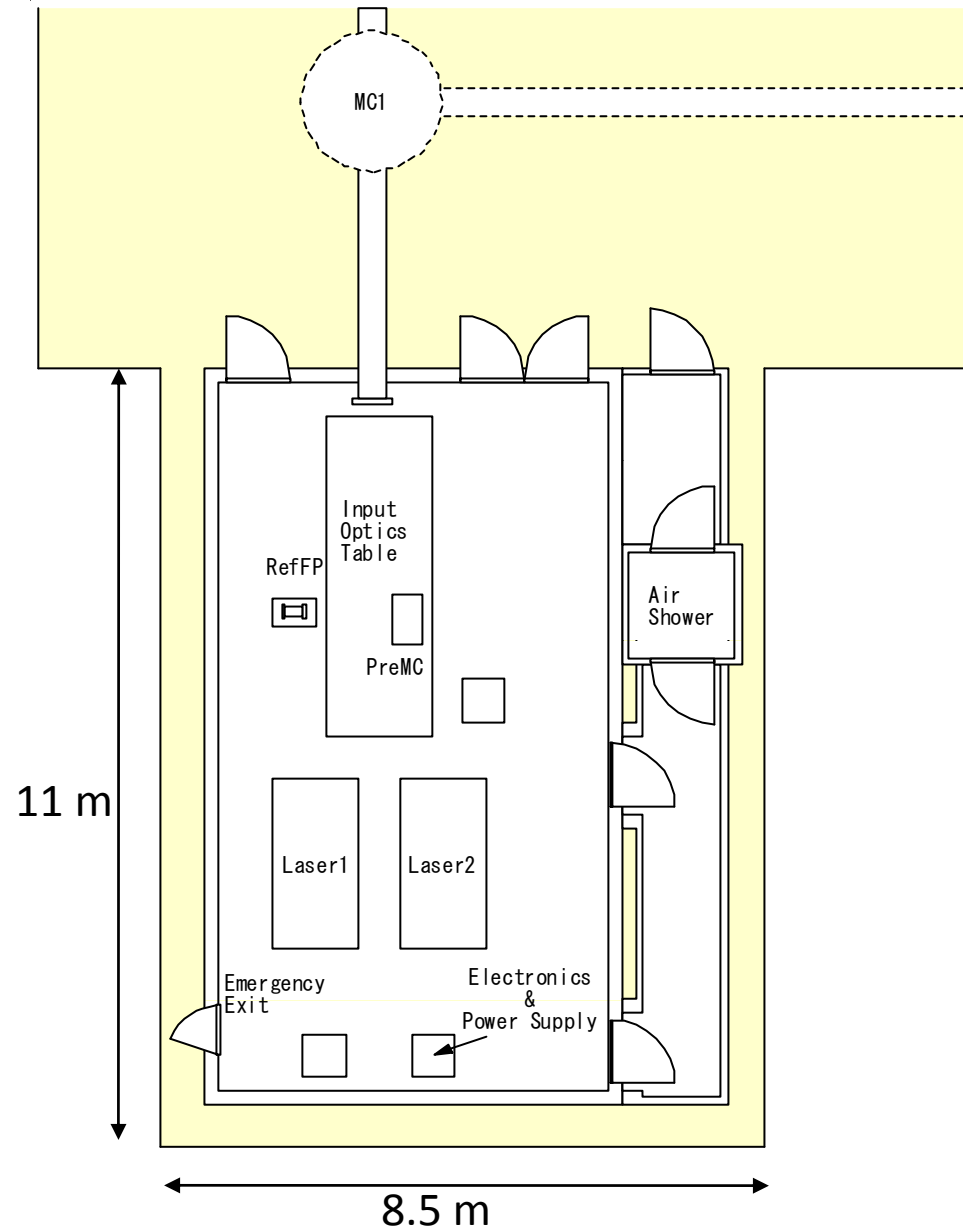
- Input optics system
- Laser pre-stabilize
- Mode cleaner
- Mode matching telescope
- Output optics system
- Output mode cleaner (after i-LCGT)

Map

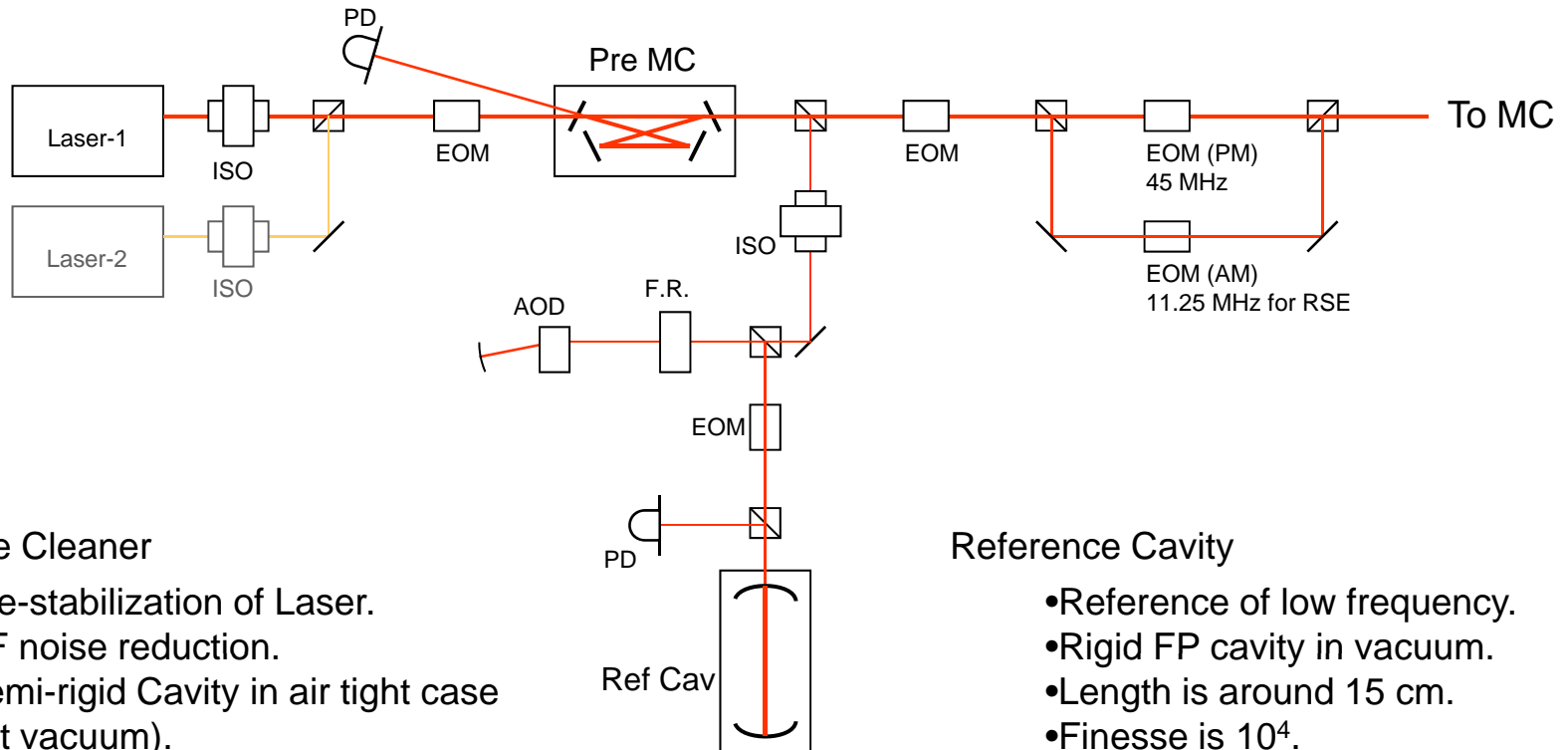


## Laser Room

- Higher class clean room than center room.
- Better temperature stability with air conditioner.
- Soundproof room.
- The floor is separated from center room floor.
- Lasers and input optics table are placed in Enclosers.



## Input Optics



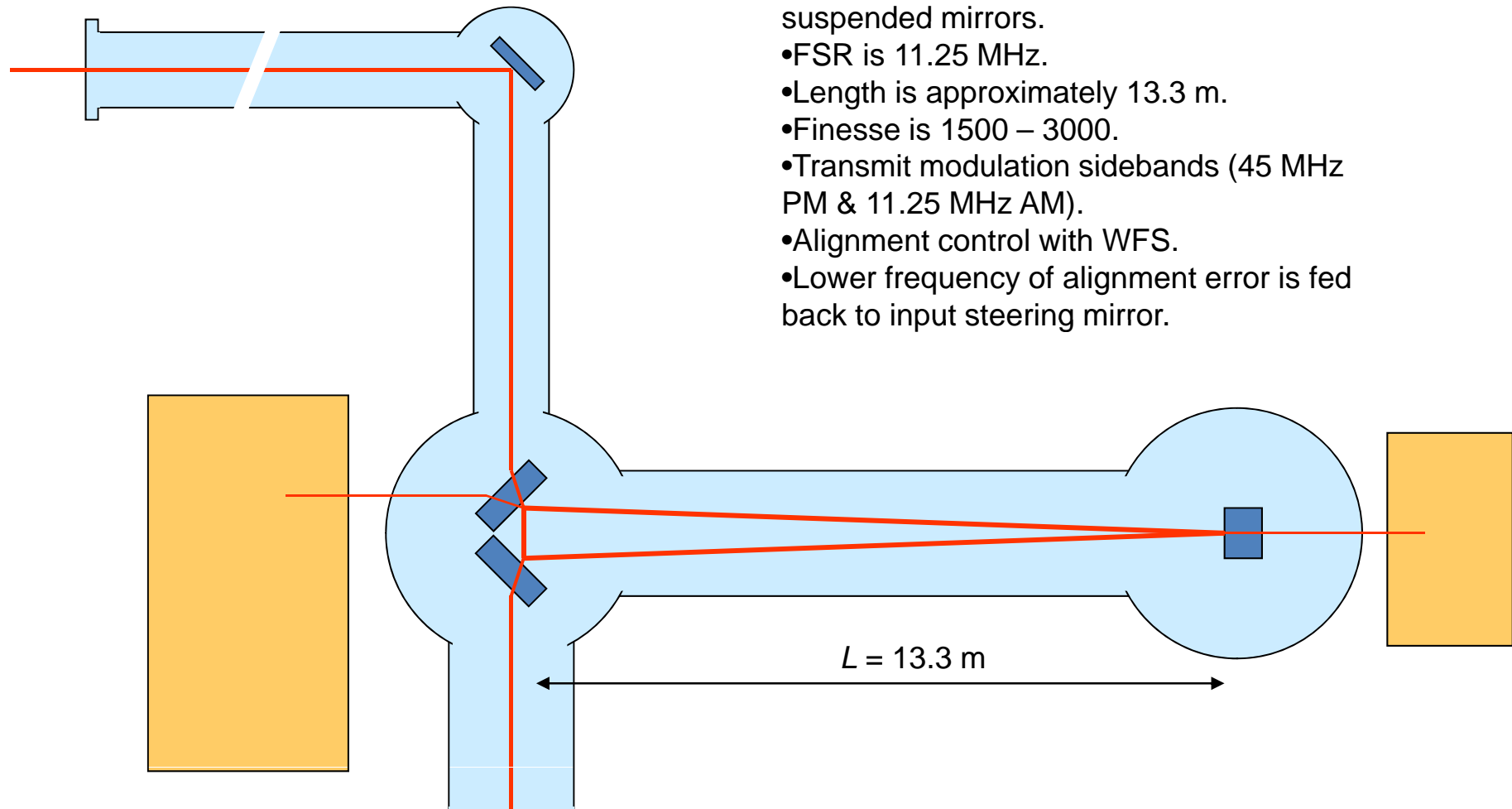
### Pre Mode Cleaner

- Pre-stabilization of Laser.
- RF noise reduction.
- Semi-rigid Cavity in air tight case (not vacuum).
- Cavity pole is around 300 kHz.
- In case of insufficient RF noise reduction with one pre-MC, two pre-MC will be used with series.

### Reference Cavity

- Reference of low frequency.
- Rigid FP cavity in vacuum.
- Length is around 15 cm.
- Finesse is  $10^4$ .

## Mode Cleaner



## Others

### Mode matching telescope

- Suspended parabola/spherical mirrors in vacuum chamber.

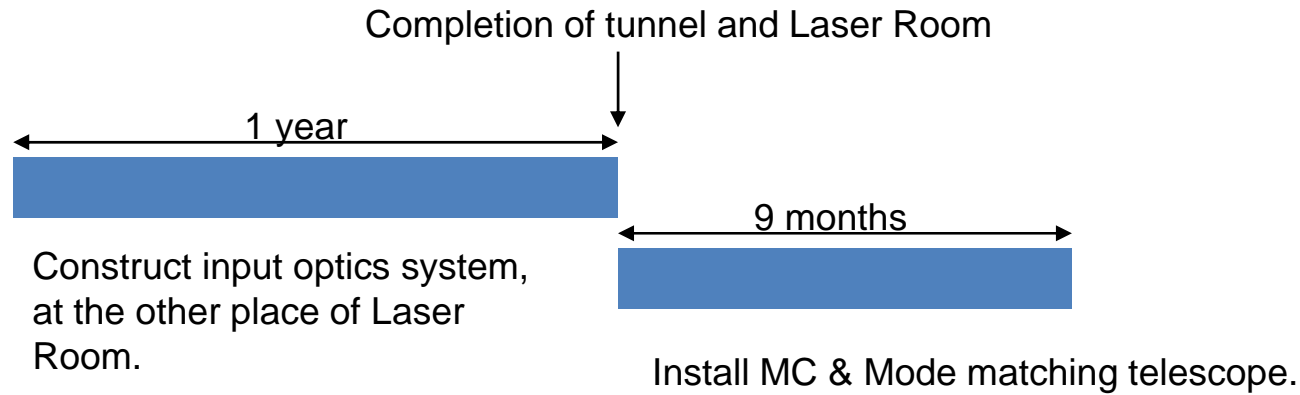
### Protection system of Photo Detector

- Shutter for PD to avoid the damage from high power laser beam, when feedback controls are unlocked.

### Output mode cleaner

- Installed after i-LCGT.

## Schedule



Before completion of tunnel and Laser Room, construct the input optics system include pre-MC and ref-Cav with high power laser at the other place of the Laser Room.

After completion of tunnel and Laser Room, move laser and input optics system into the Laser Room, and then install MC and mode matching telescope.



## Cost

At a rough estimate there are about 70,000,000 yen (=0.7 million US\$).  
The above cost is excluded the cost of the facility of Laser Room, MC mirrors, MC suspension system, mode matching telescope and output MC.