

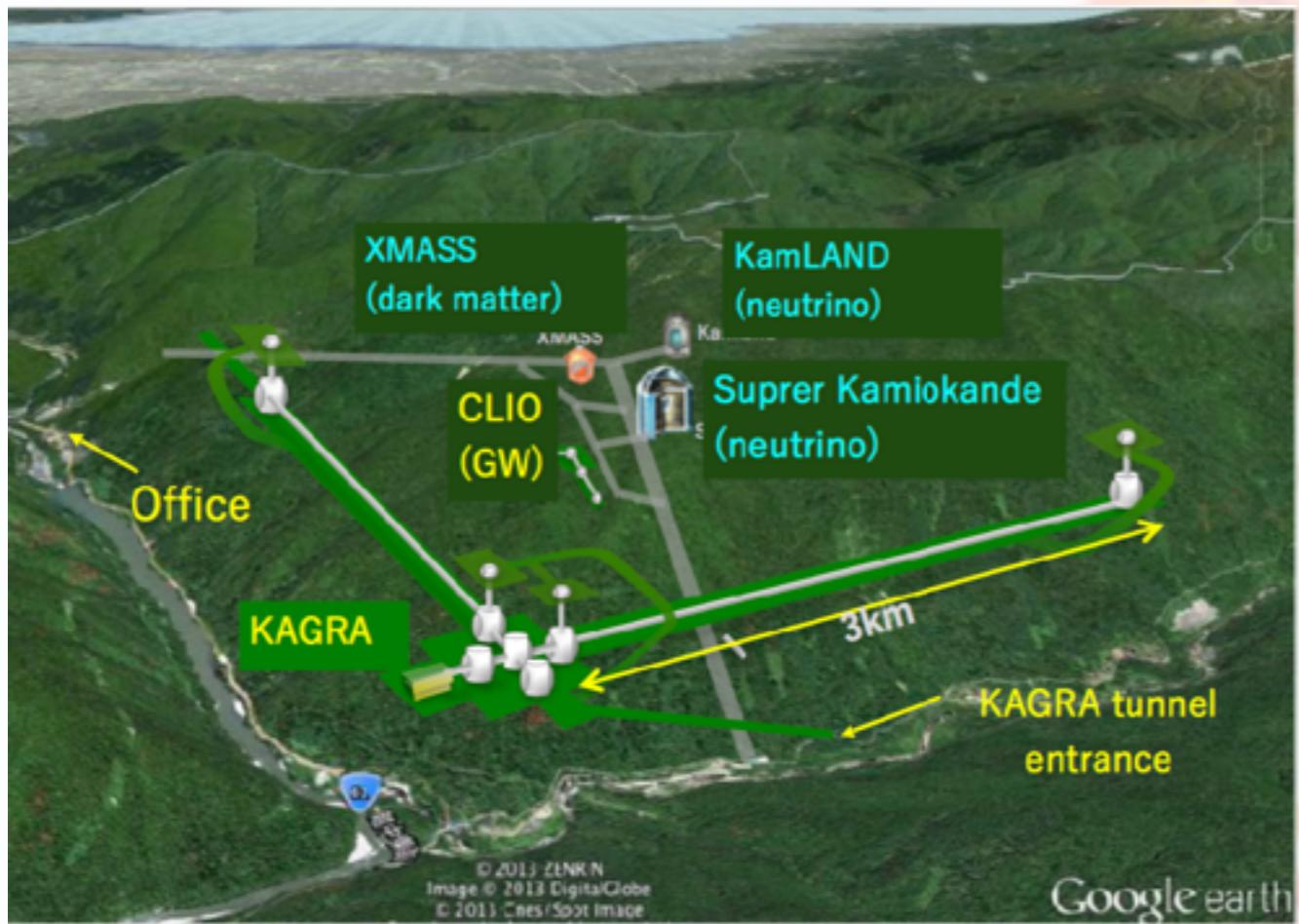
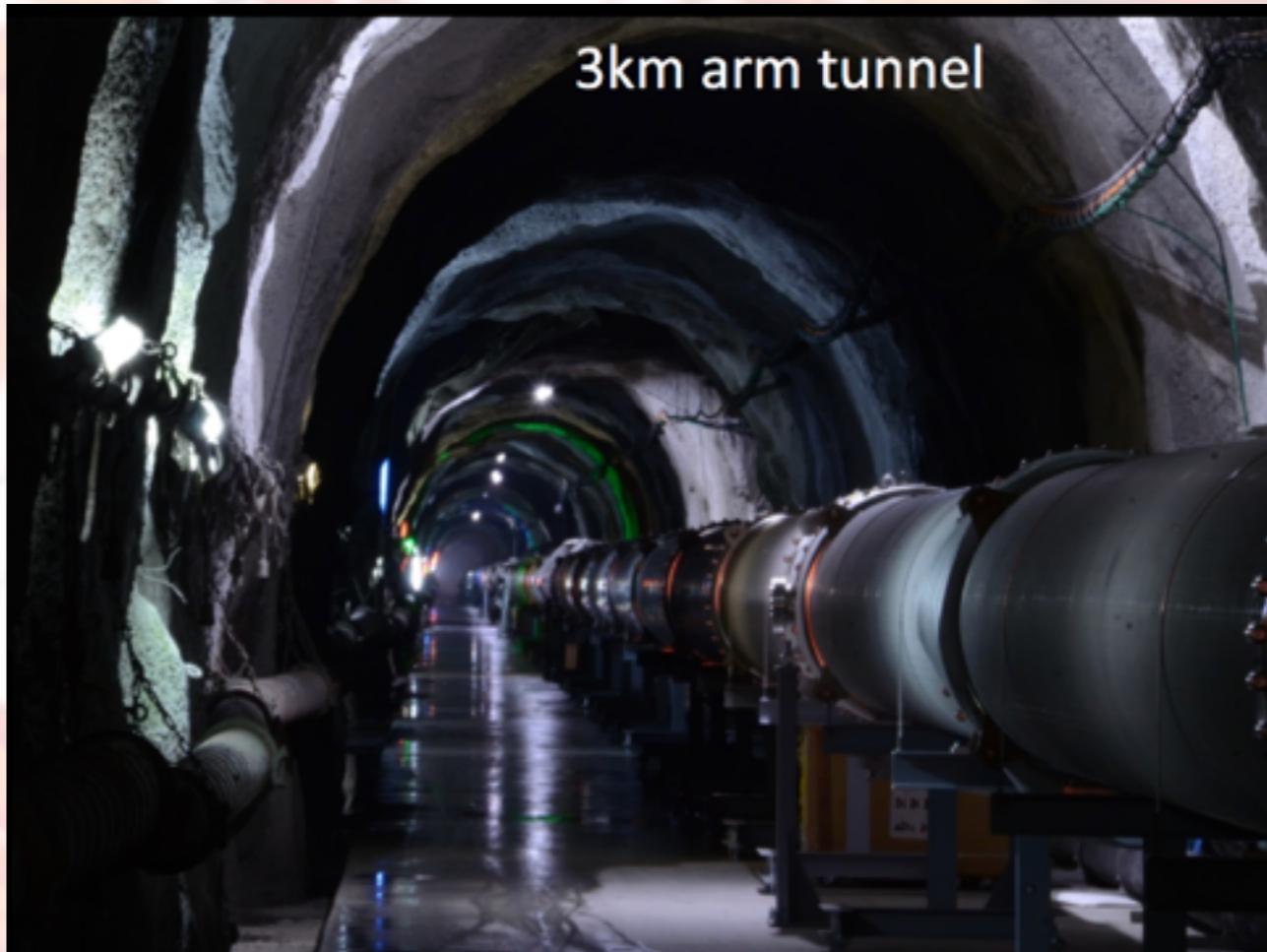
Current status of KAGRA

Takaaki Yokozawa,
ICRR University of Tokyo



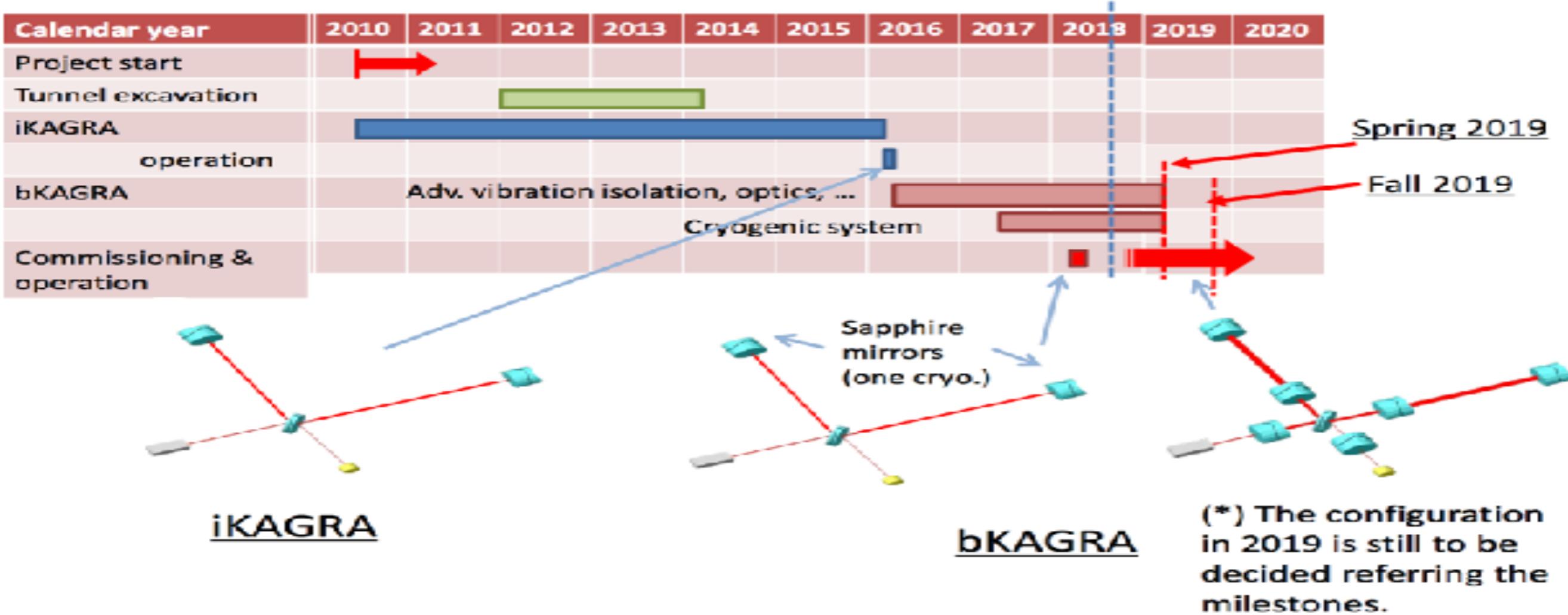
KAGRA overview

- Japanese large interferometer
- Hida, Gifu (SK in same mountain)
- **3km** arm in each
- **Underground** experiment
- **Cryogenic** to 20K for main mirror
- Various advanced techniques
- etc...

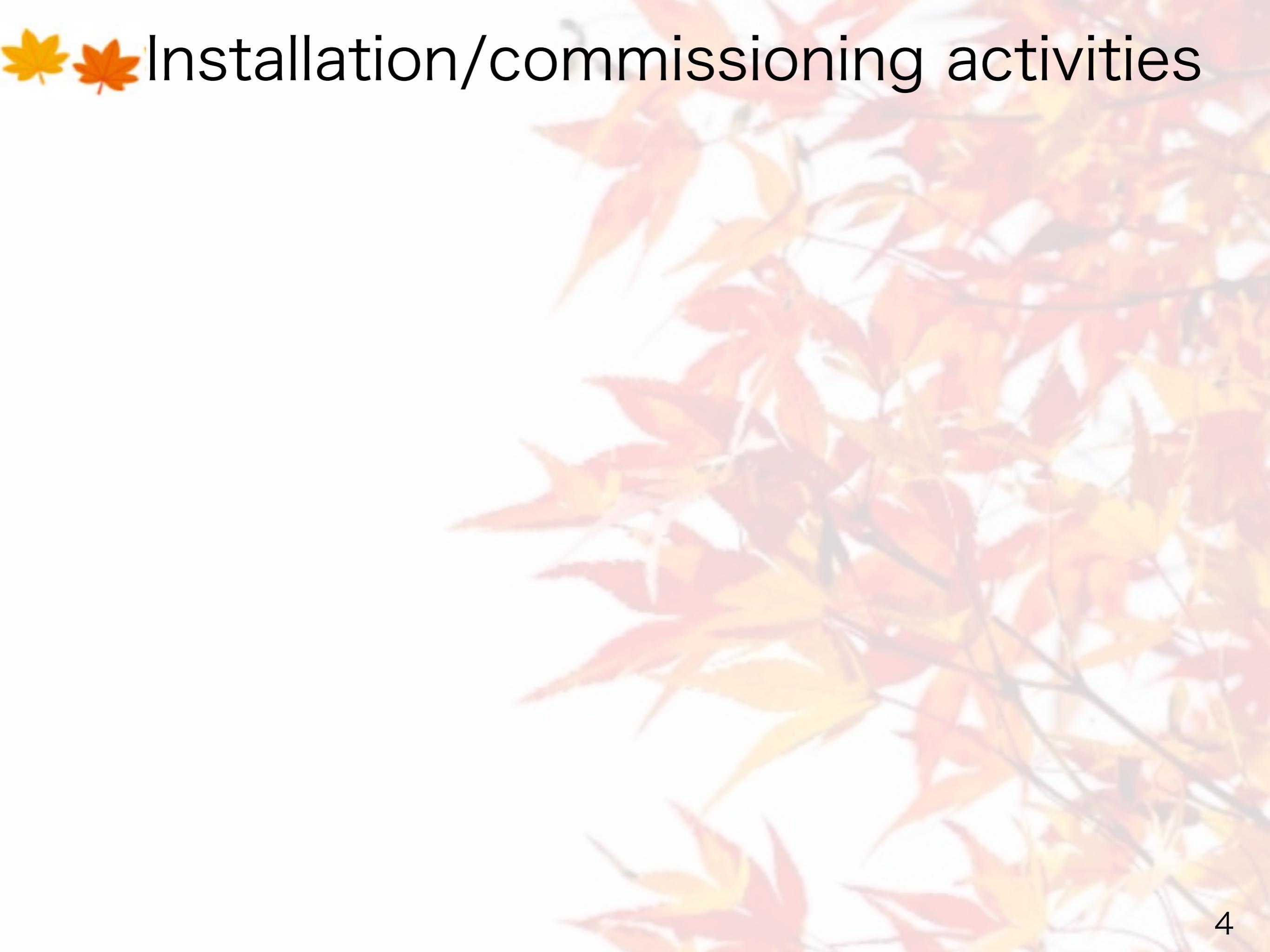




KAGRA overview



- **End of next March**, the installation work will finish, and start **deep commissioning**
 - Mar.-Apr./2016 … iKAGRA test run (simple Michelson with simple suspension)
 - Apr.-May/2018 … bKAGRA phase1 test run (cryogenic Michelson)
- Current KAGRA activities
 - Finish the installation of the all input optics
 - Finish the installation of the almost all suspensions
 - Sep.-Nov. X arm commissioning(First 3km arm cavity)
 - Jan. 2019- commissioning for full operation



Installation/commissioning activities

KAGRA construction

first science run in FY2017

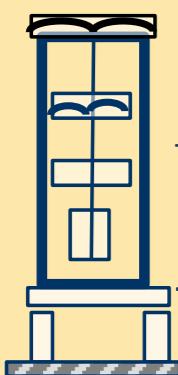
bKAGRA configuration

- Cryogenic test masses
- 3 km arm cavities
- RSE with power recycling



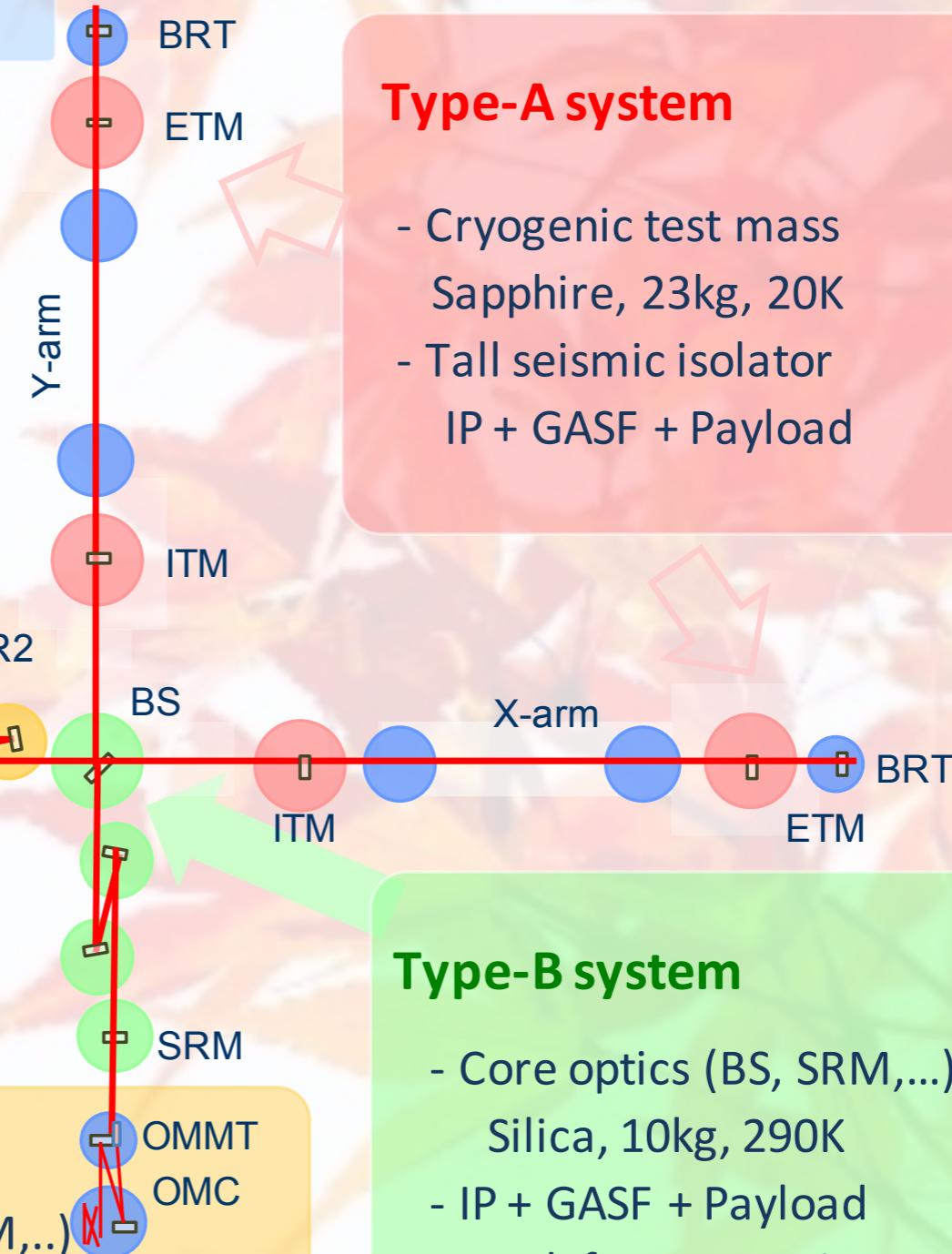
Type-C system

- Mode cleaner
Silica, 0.5kg, 290K
- Stack + Payload



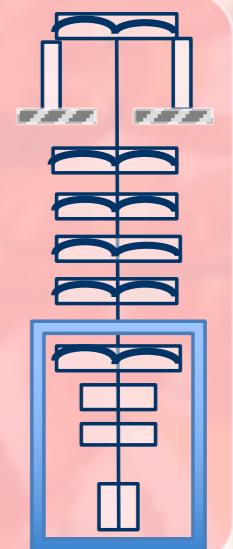
Type-Bp payload

- Test mass and Core optics (BS, FM,...)
Silica, 10kg, 290K
- Seismic isolator
Table + GASF + Type-B Payload



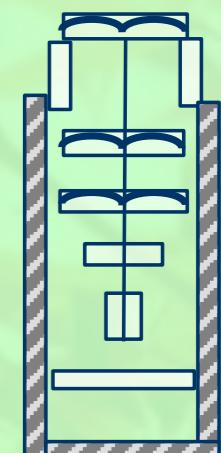
Type-A system

- Cryogenic test mass
Sapphire, 23kg, 20K
- Tall seismic isolator
IP + GASF + Payload

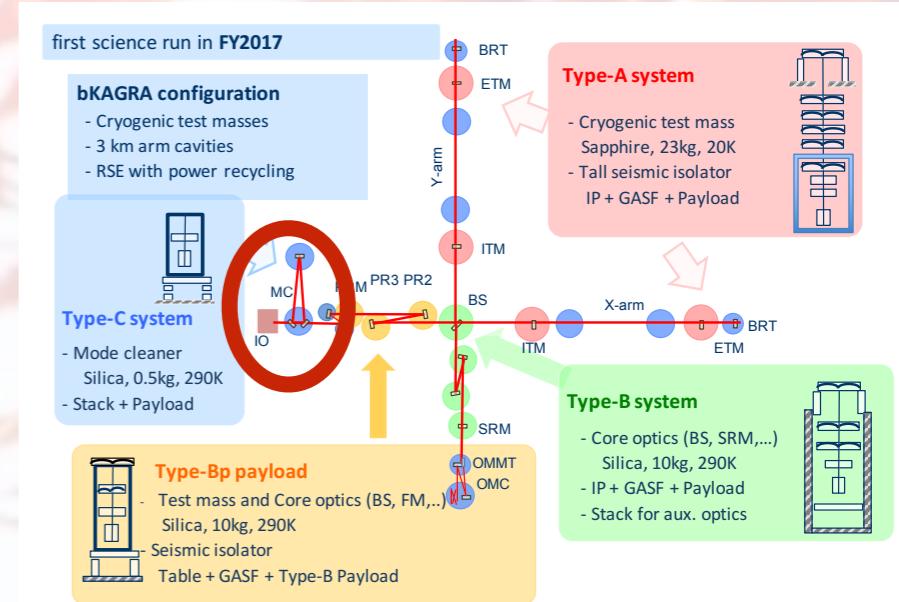


Type-B system

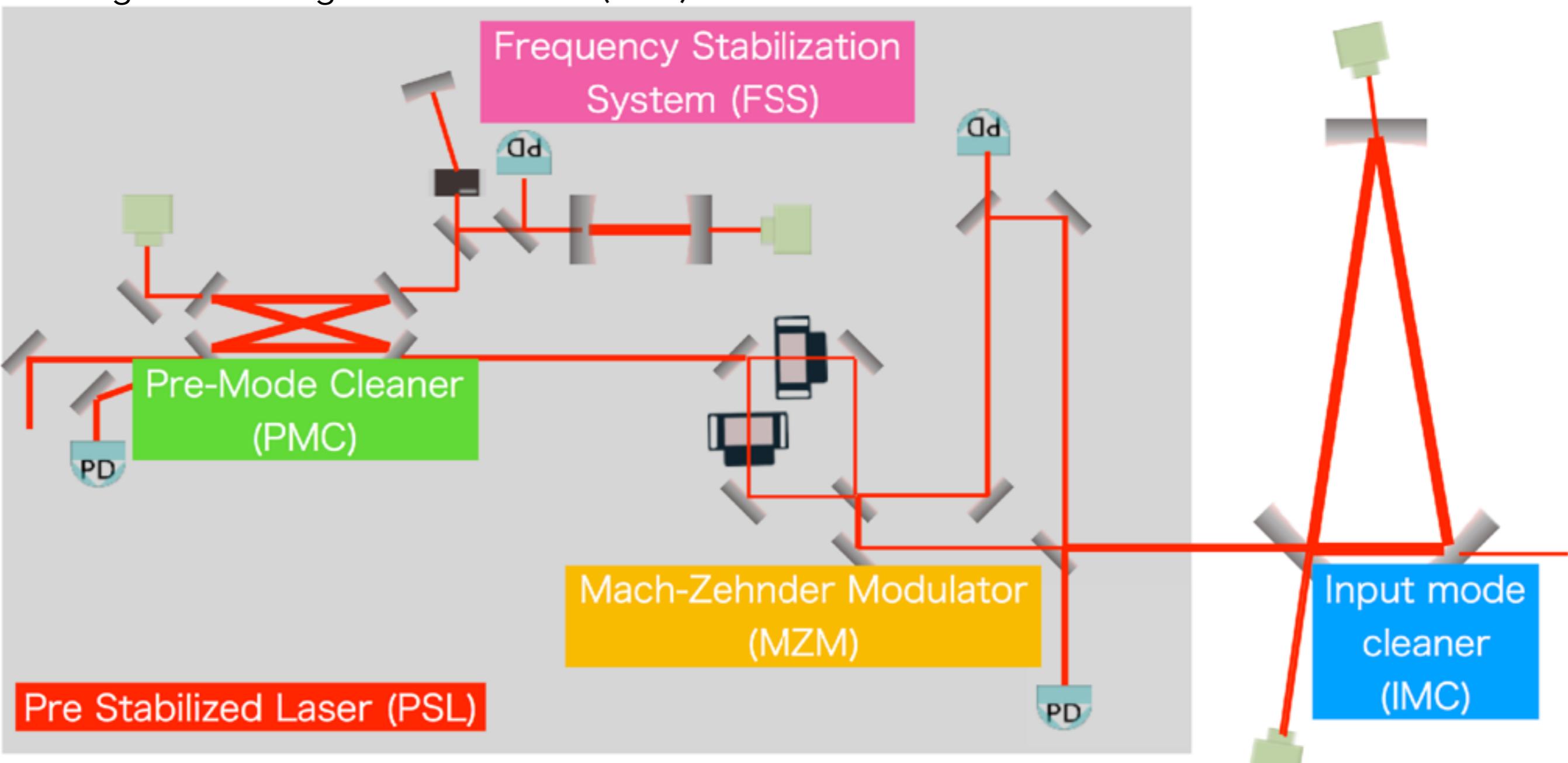
- Core optics (BS, SRM,...)
Silica, 10kg, 290K
- IP + GASF + Payload
- Stack for aux. optics



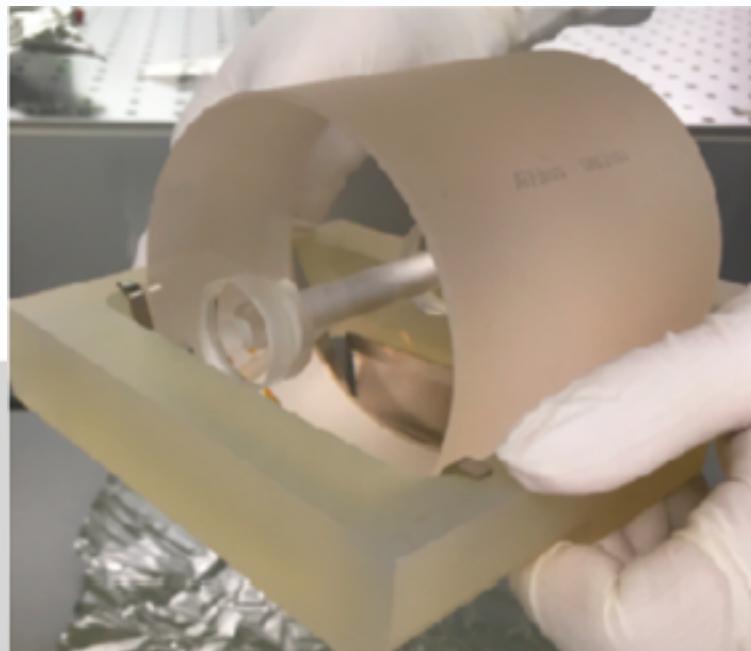
Input optics installation



- + Intensity Stabilization System(ISS)
- + Alignment Length Stabilization (ALS)



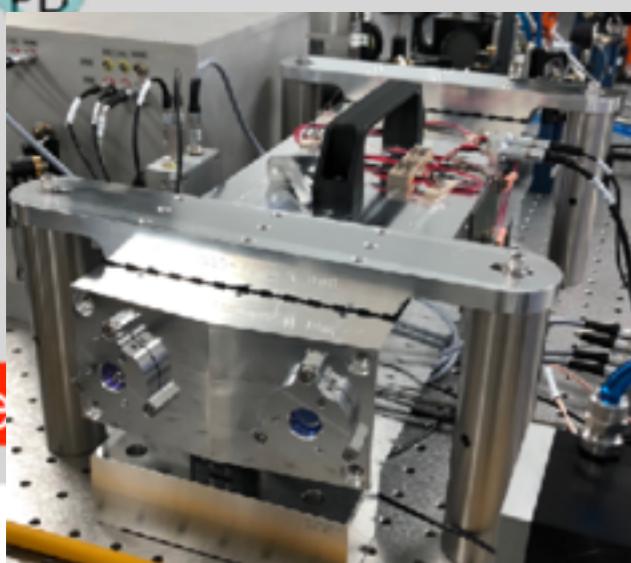
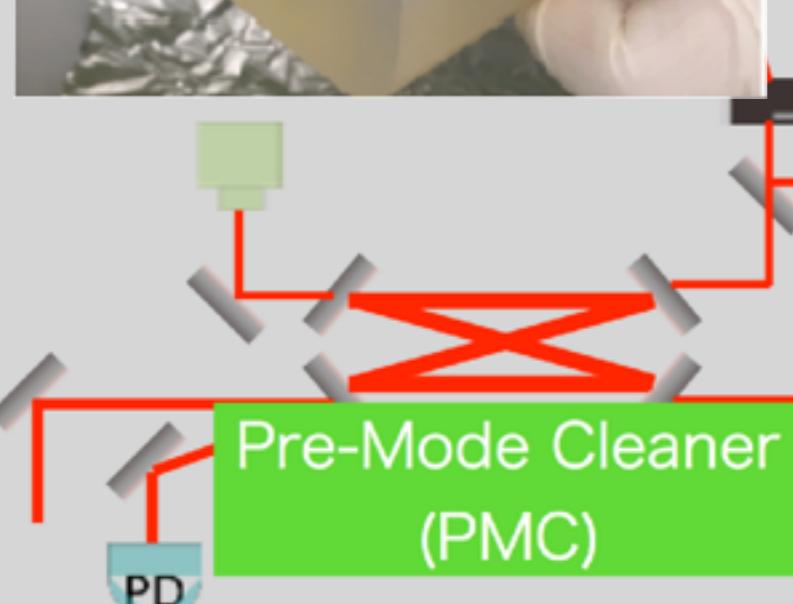
Input optics installation



System(ISS)

Y-arm (VAVO)

Frequency Stabilization System (FSS)



Pre

Mach-Zehnder Modulator (MZM)

first science run in FY2017

bKAGRA configuration

- Cryogenic test masses
- 3 km arm cavities
- RSE with power recycling

Type-C system

- Mode cleaner Silica, 0.5kg, 290K
- Stack + Payload

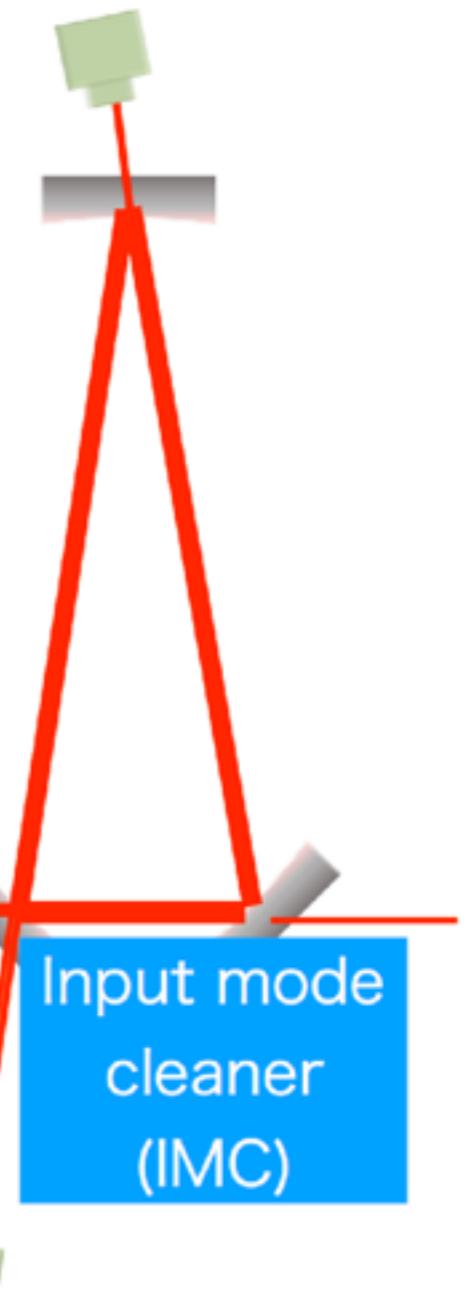
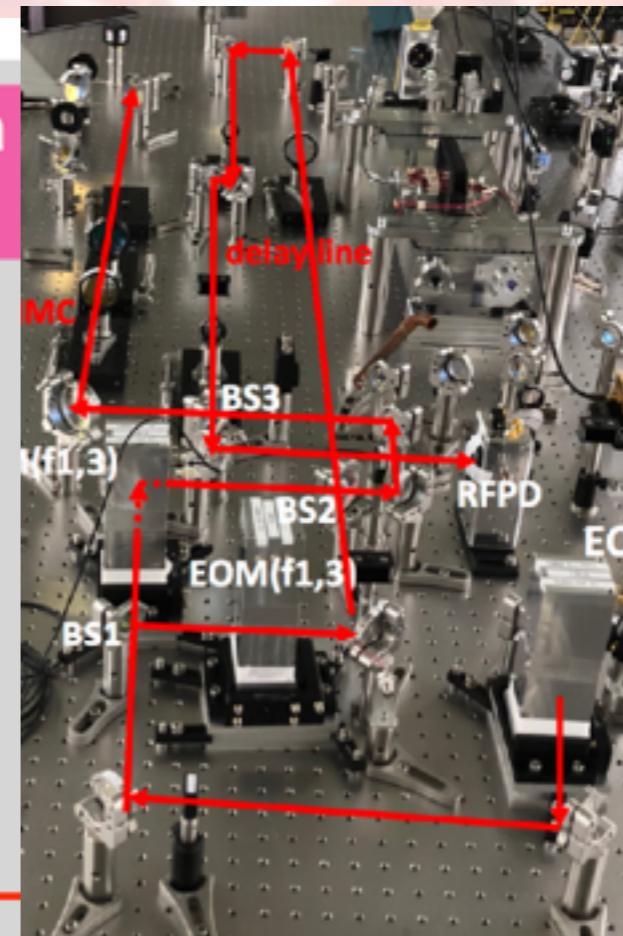
Type-Bp payload

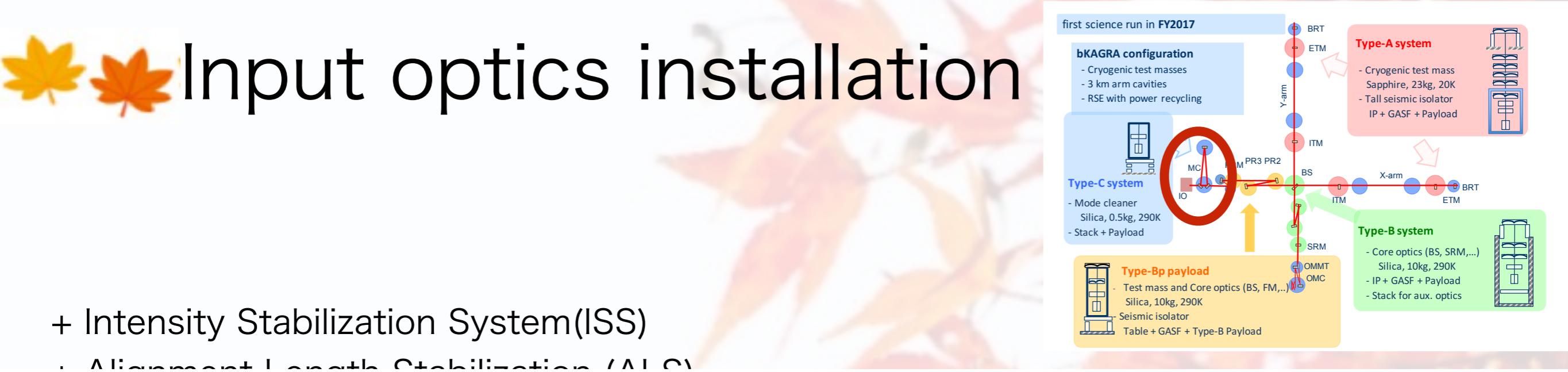
- Test mass and Core optics (BS, FM,...)
- Silica, 10kg, 290K
- Seismic isolator

Table + GASF + Type-B Payload

Type-A system

- Cryogenic test mass Sapphire, 23kg, 20K
- Tall seismic isolator IP + GASF + Payload

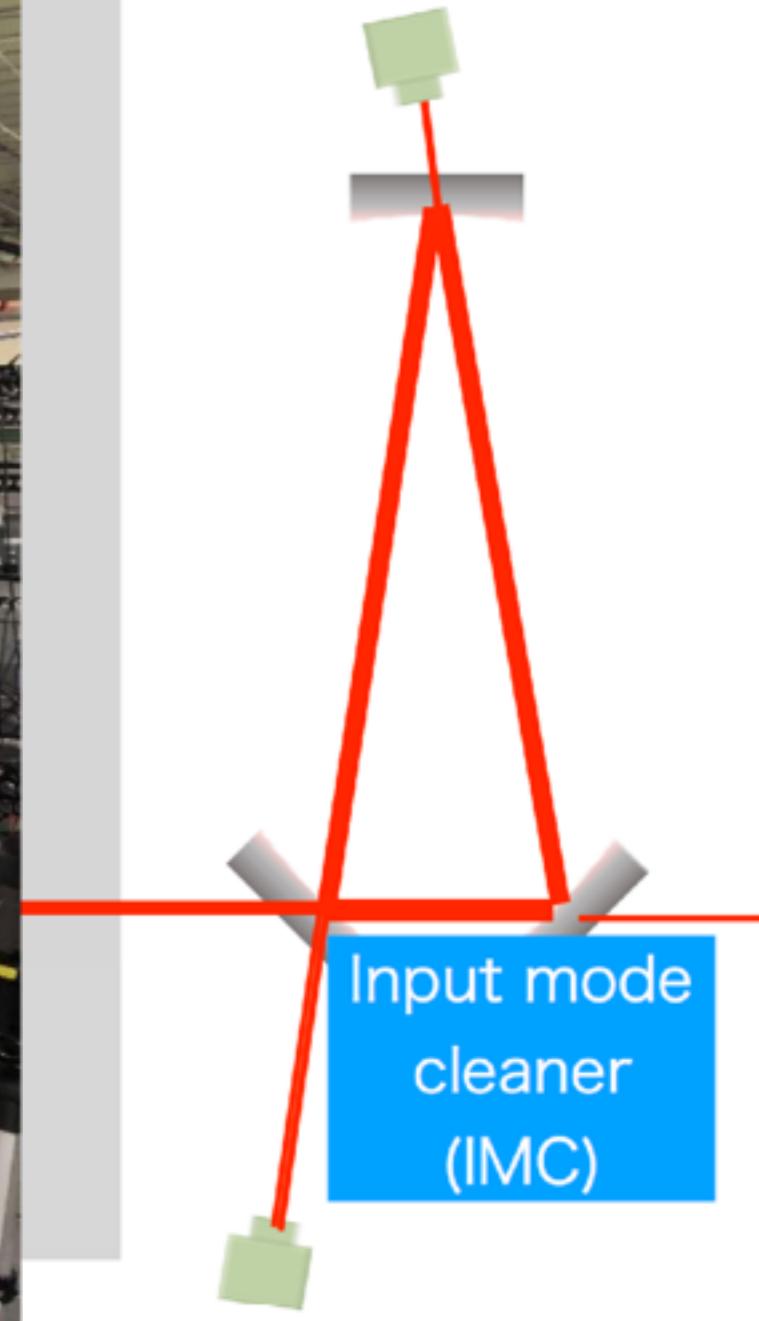


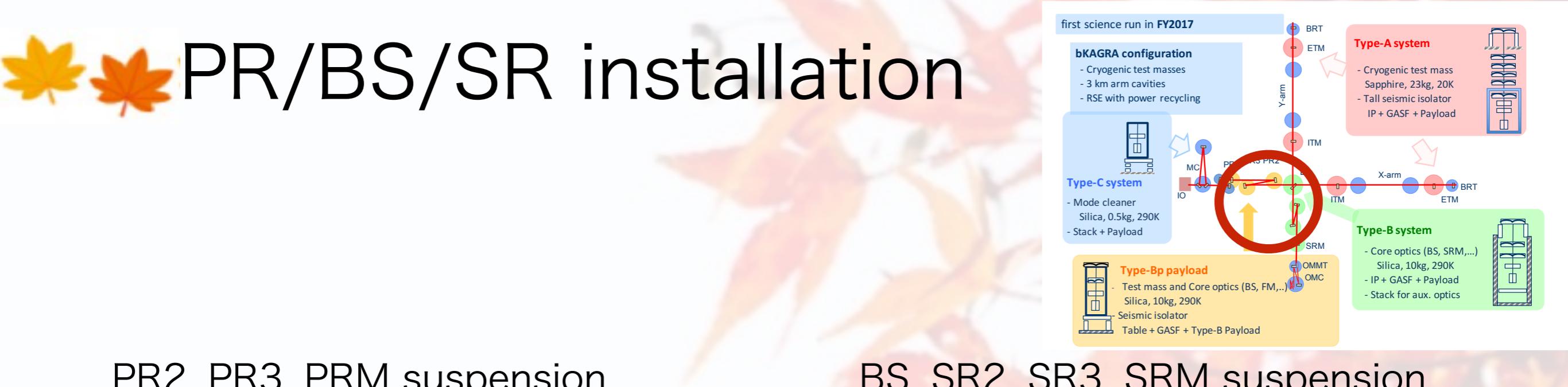


Input optics installation

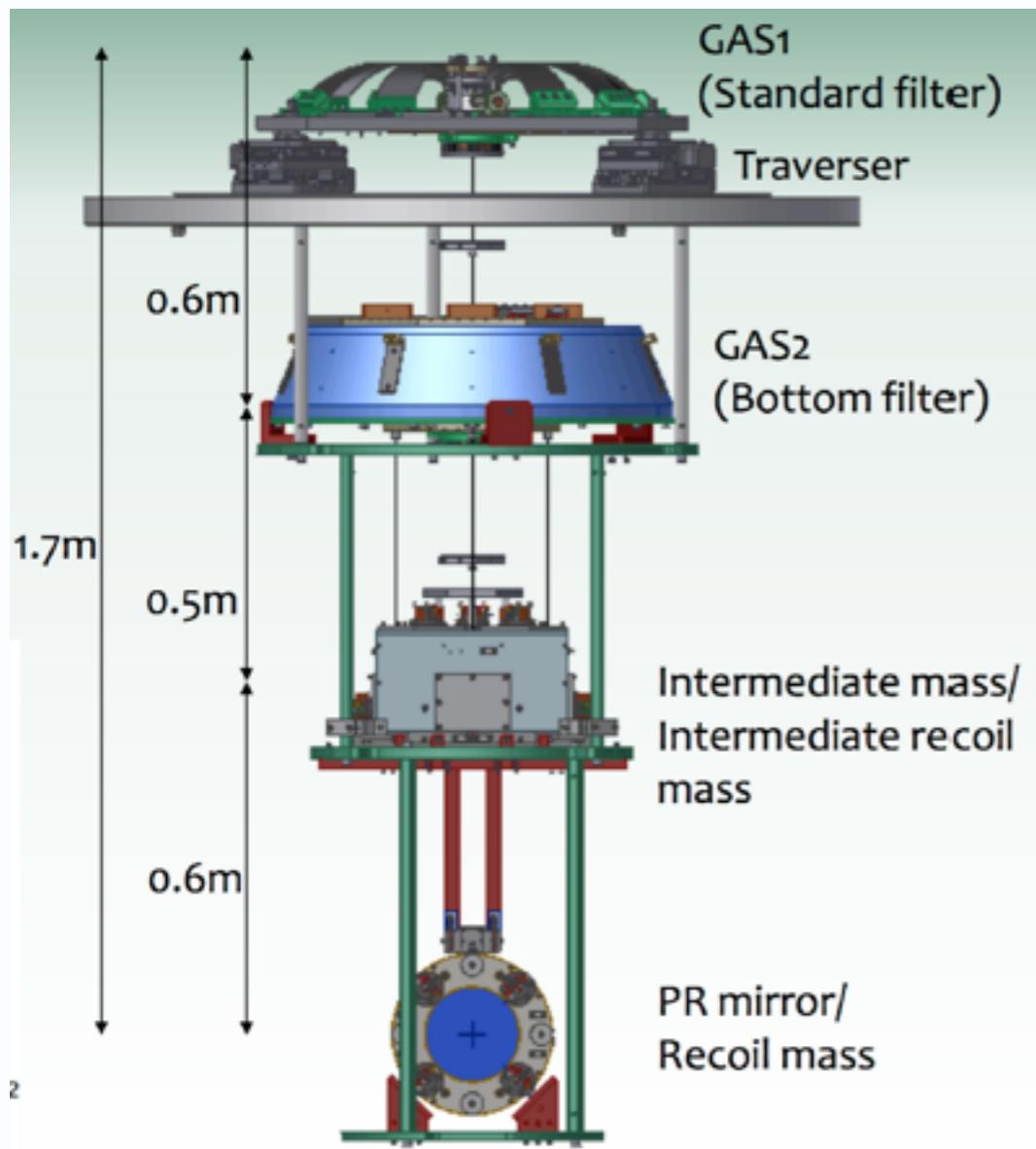
+ Intensity Stabilization System(ISS)

- Alignment Length Stabilization (ALS)

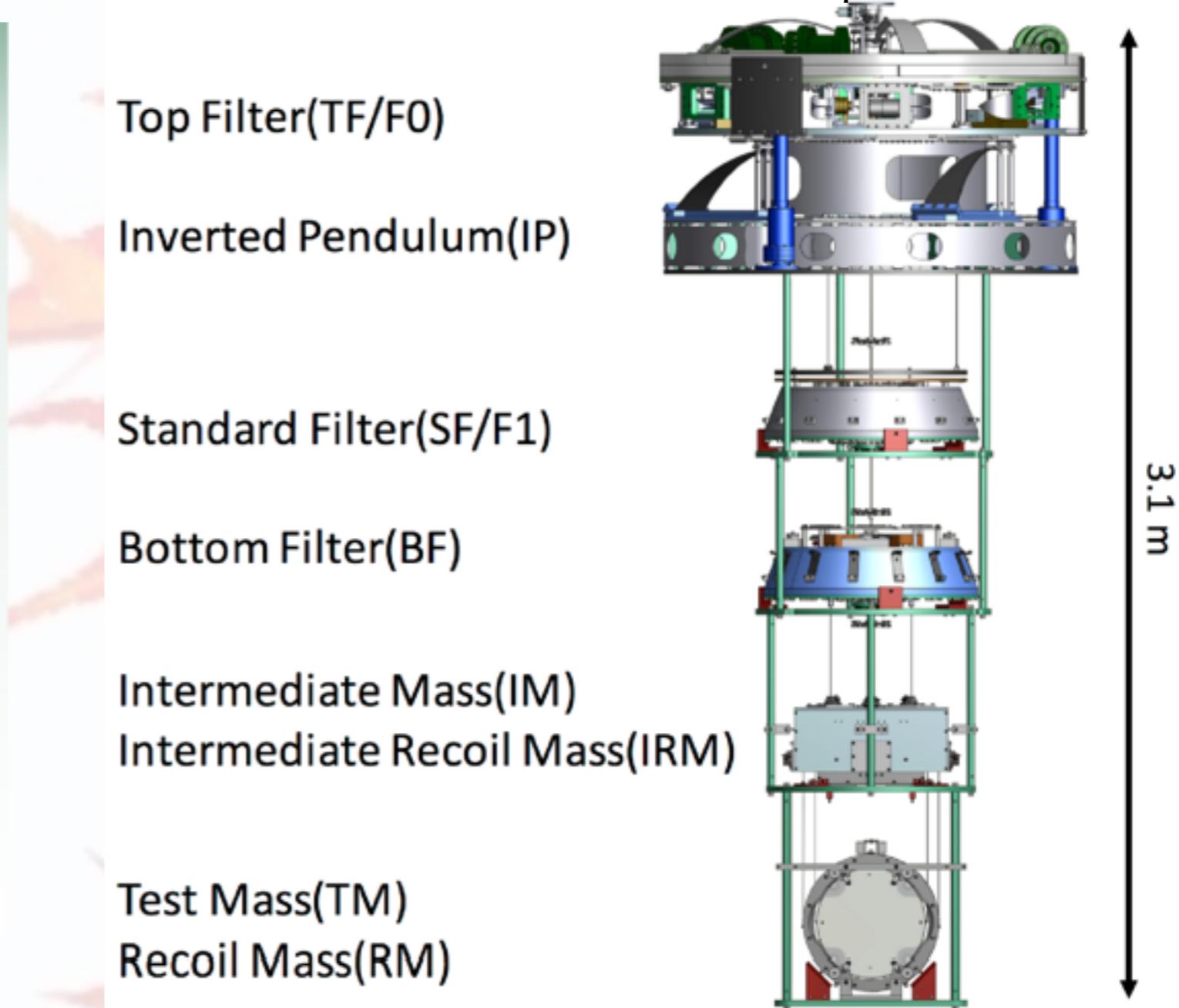


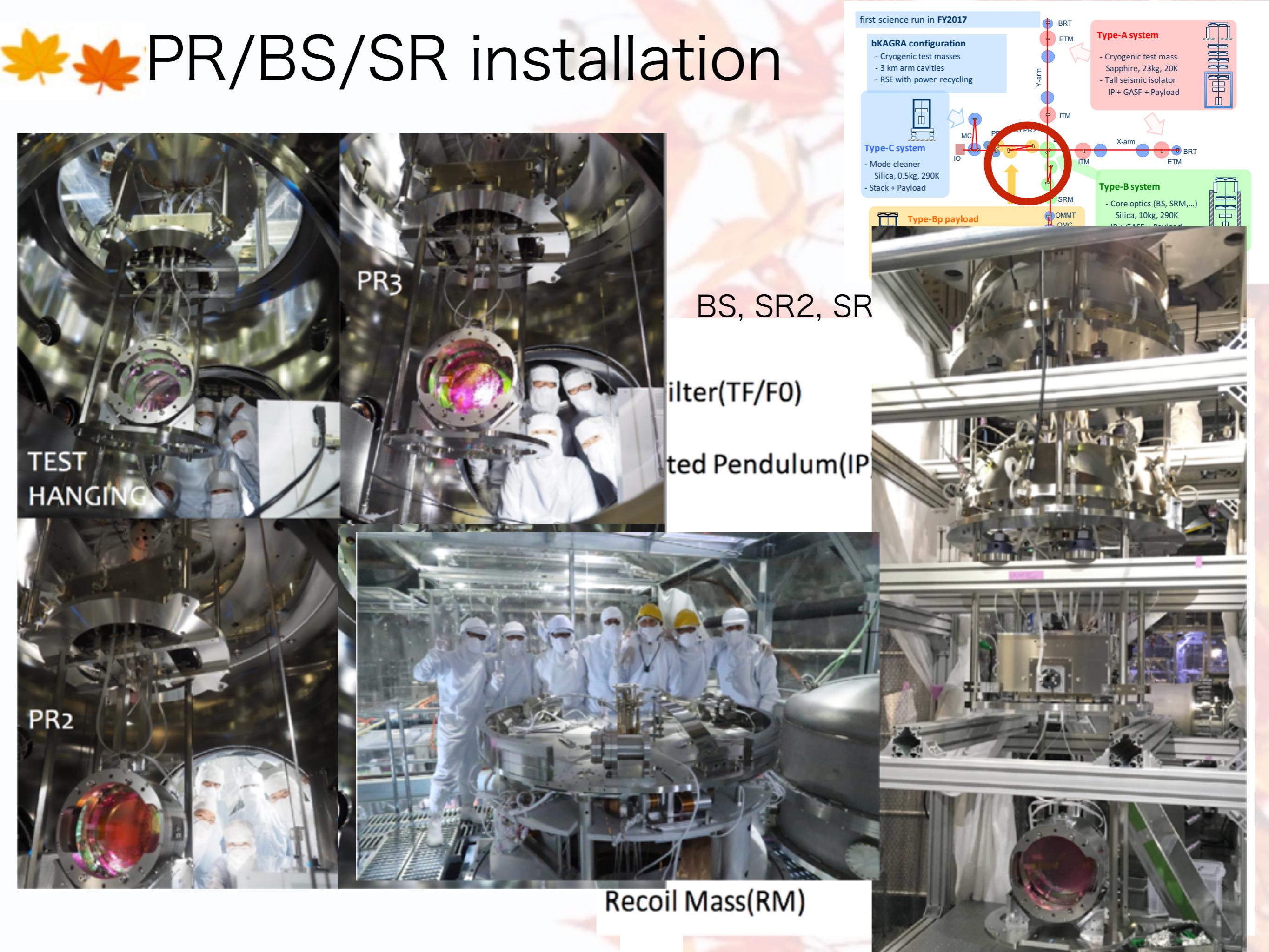


PR2, PR3, PRM suspension



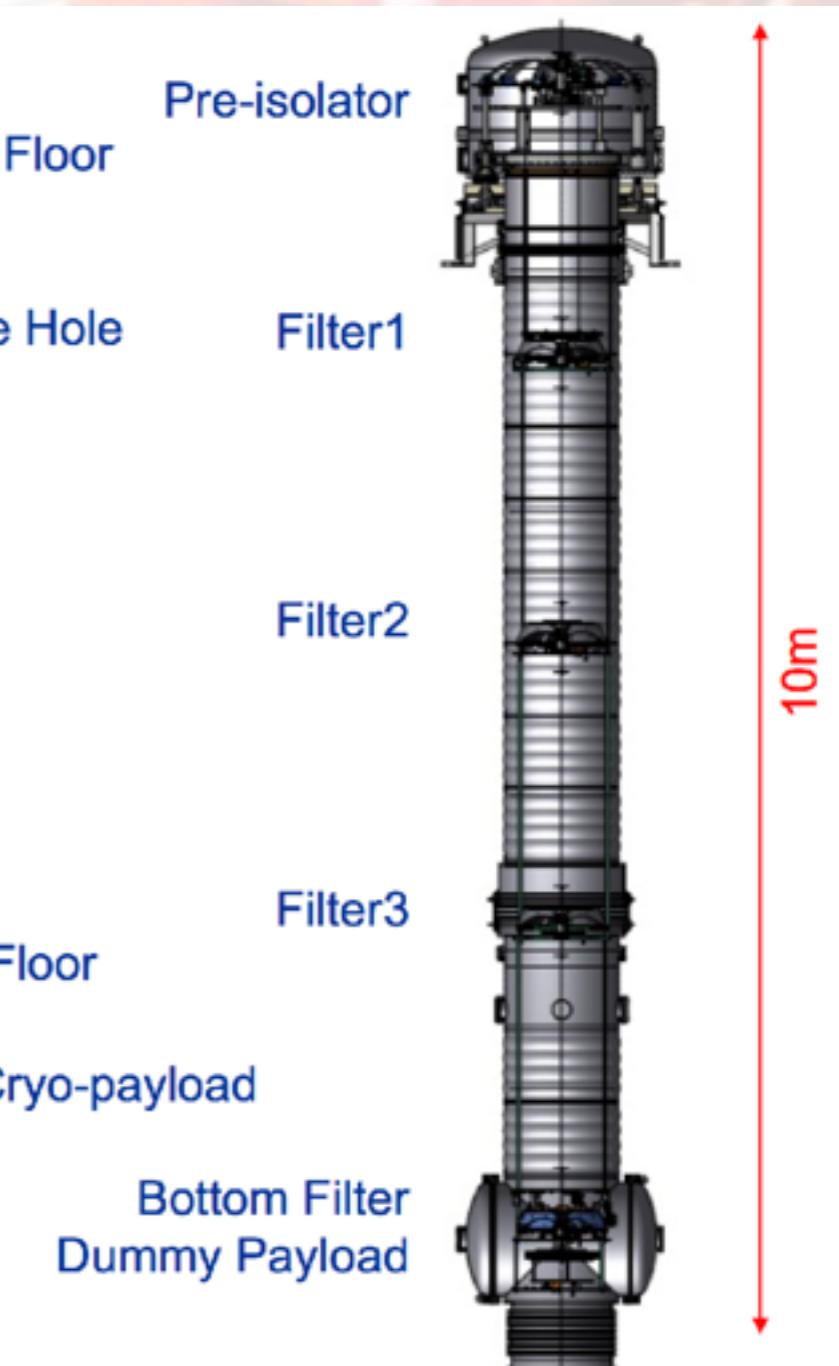
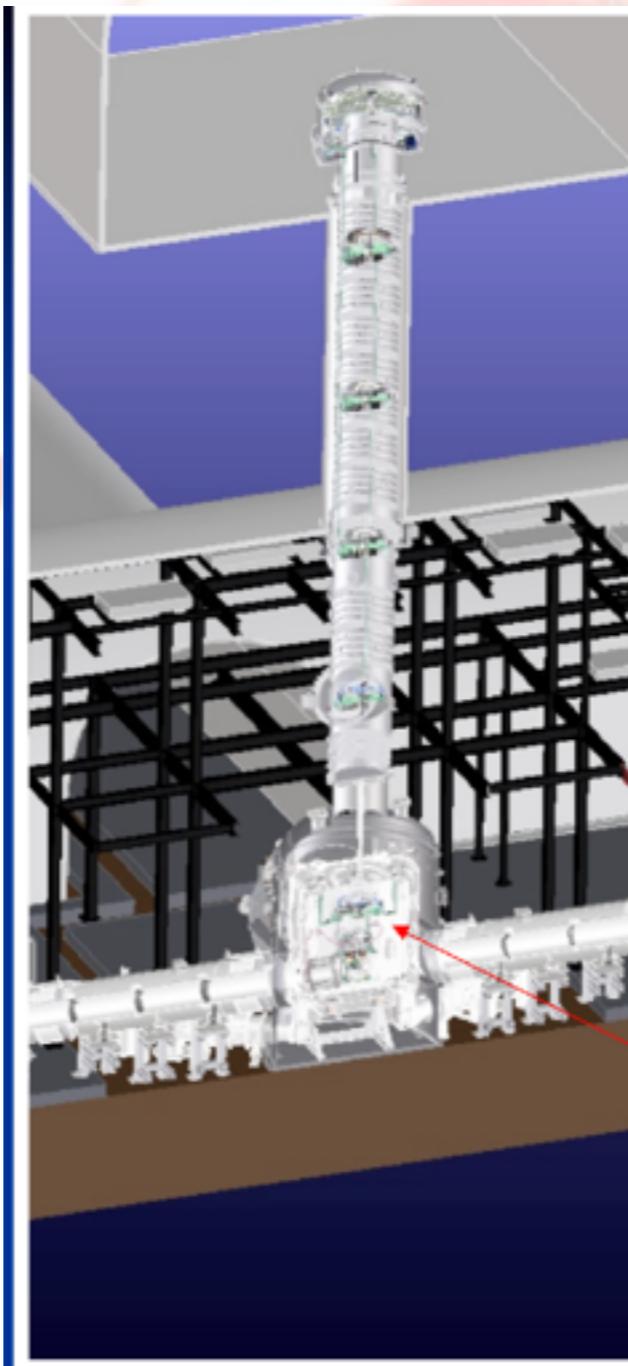
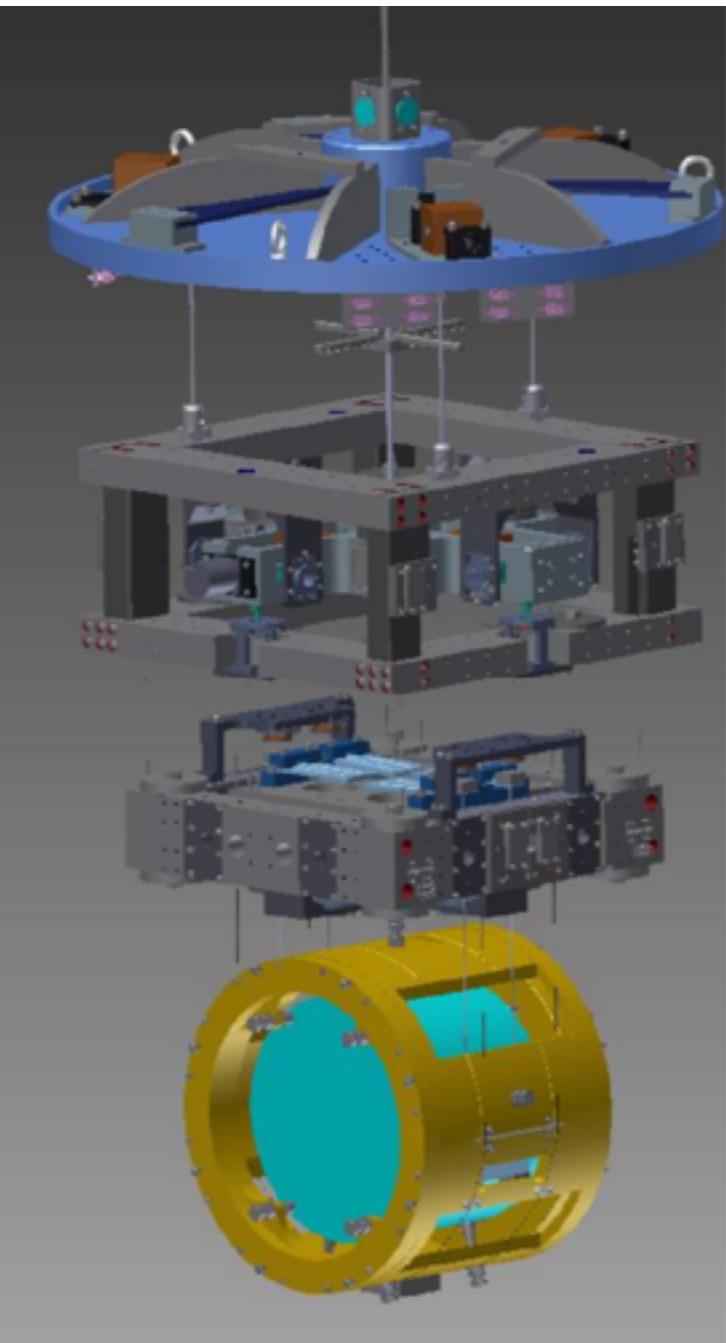
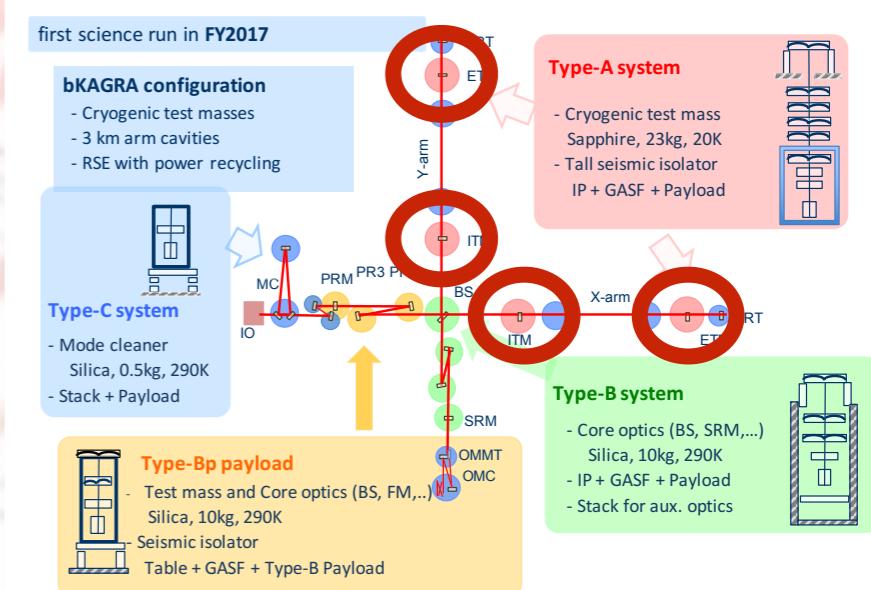
BS, SR2, SR3, SRM suspension

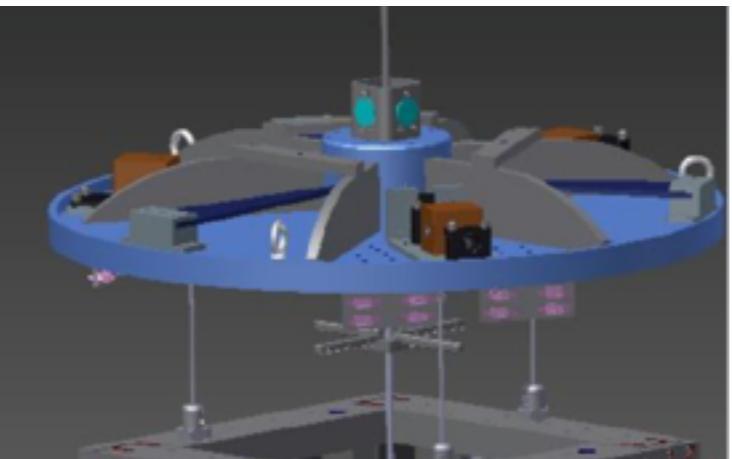
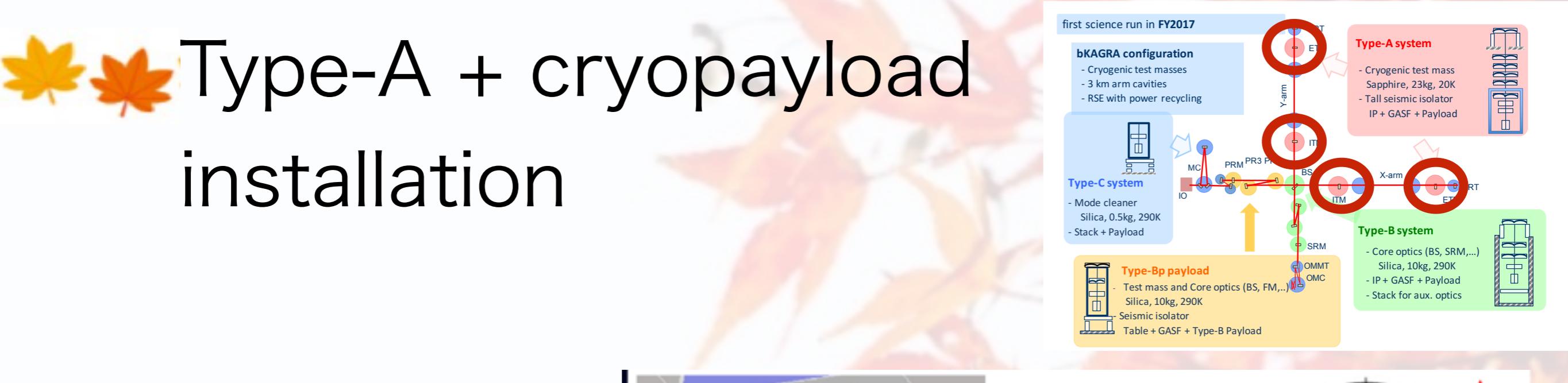




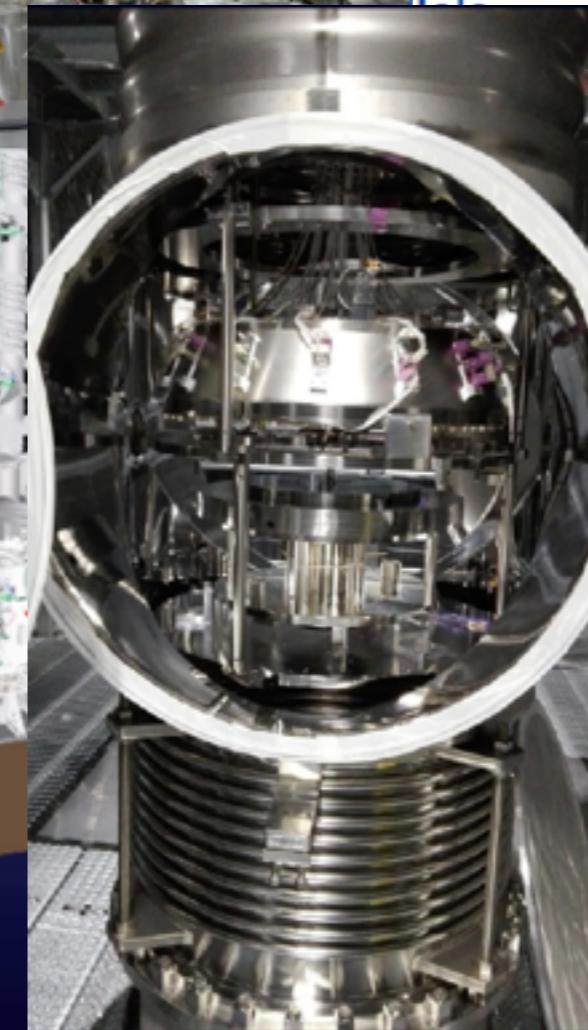
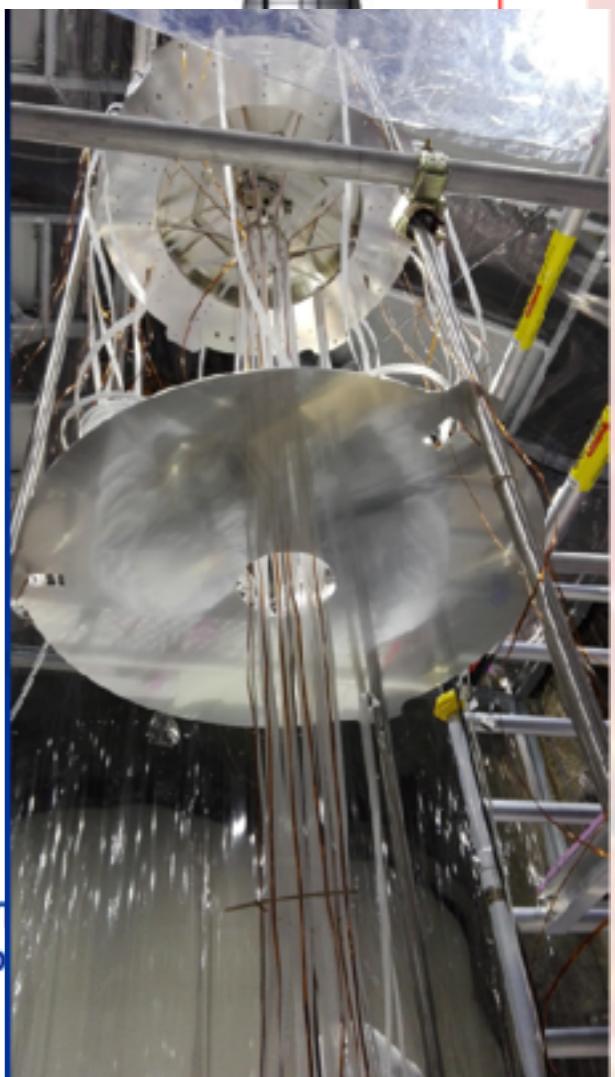


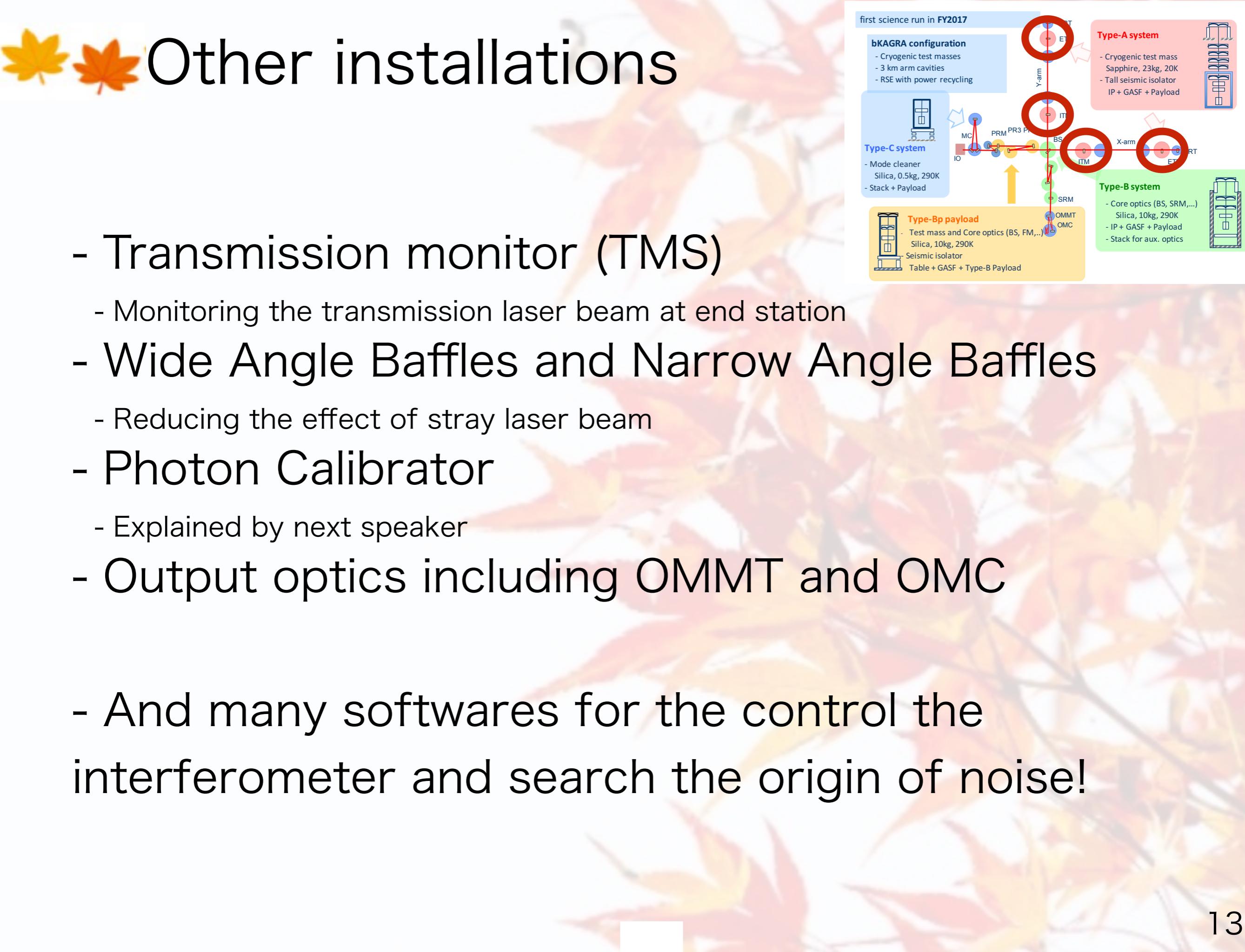
Type-A + cryopayload installation

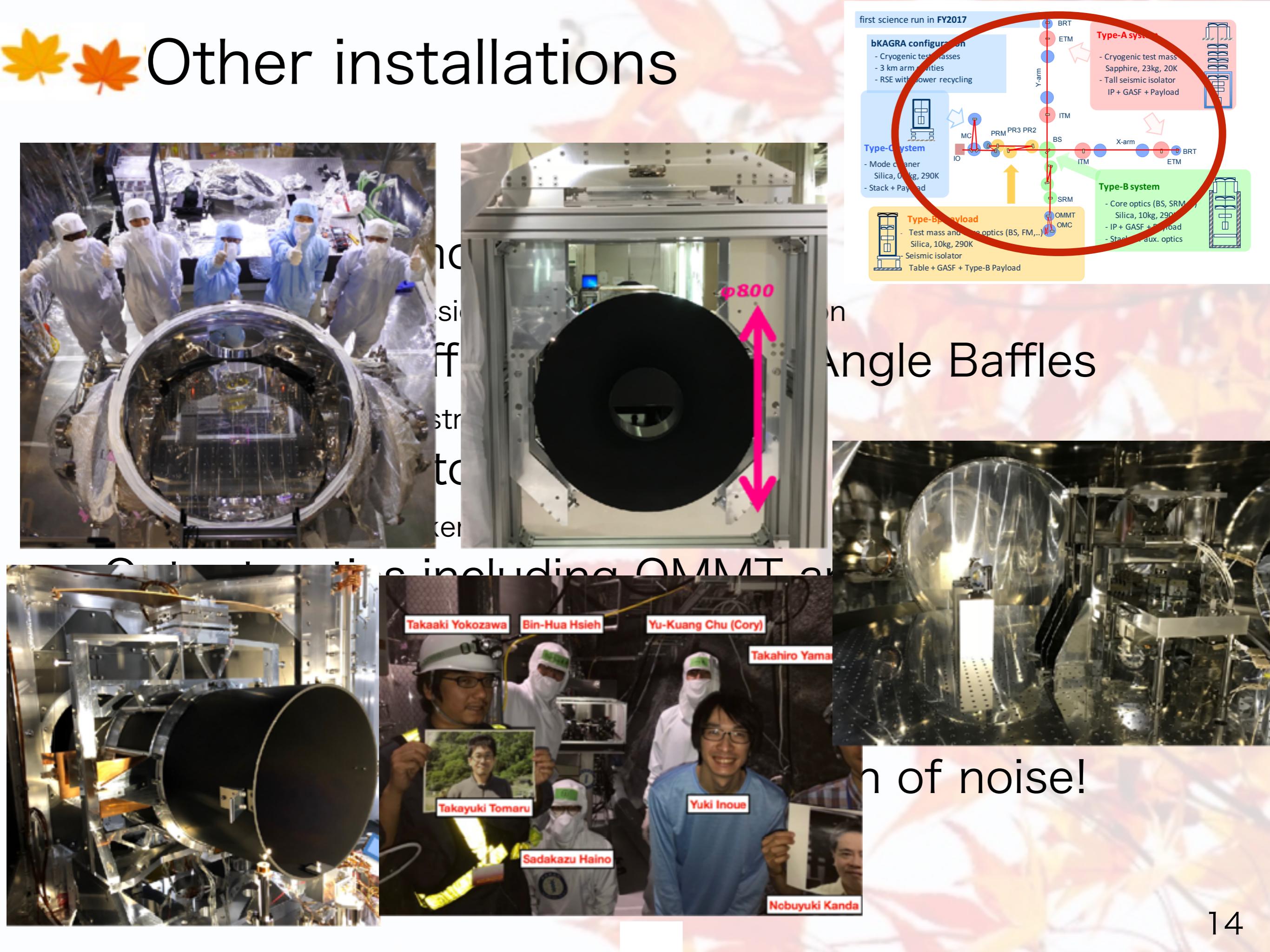




Pre-isolator







Other installations



Commissioning status

- Nov. 2018 X-arm commissioning
 - All Type-A+cryogenic suspensions were installed!
 - We achieved the lock of the X-arm cavity with the green laser continuously for two hours, main IR laser is in progress
- Dec. 2018 - Jan. 2019(?) Y-arm commissioning
- Jan. 2019 - Mar. 2019 DRMI commissioning
- April 2019 - FPMI and DRFPMI commissioning



PEM activities

- PEM installation
 - We prepared various accelerometers, magnetometers, microphones, waiting for receiving.
 - PEM installation procedure
 - PSL room
 - Various optical tables
 - Air monitors
 - Chamber monitors
 - PCal monitors
 - Weather stations
 - Arm monitors
 - RF monitors
 - Power monitors
 - ...





PEM activities

- PEM installation
 - We already installed the accelerometer, magnetometer and microphone to PSL(Pre Stabilized Laser) room
- You can see the details at KAGRA wiki
 - <http://gwwiki.icrr.u-tokyo.ac.jp/JGWwiki/KAGRA/Subgroups/PEM>
- Various measurements are ongoing and analyzing now
 - Acoustic injection and vibration injection using large speakers and impulse hummer and so on.
 - Accelerometer check (optical table butterfly mode, Magnetic field check, periscope characterization)
 - Noise floor and Line characterization
 - Search the coherent channel with PEM
 - Air monitors and other PEM installation
 - Evaluate the those environmental noise affected to laser stabilization and GW strain signals

