

# Update on KAGRA instrument

OpenLVKEM town hall, Jan. 26, 2023

## Digest for the past month

- **Good news**
  - Test run with the Fabry-Pérot Michelson (FPMI) was conducted at the year-end and new year's holidays. Results appear to be nice.
  - Low-frequency noise is improved from O3GK
  - To make the high-frequency noise better:
    - Commissioning for the realization of Power-Recycled FPMI (PRFPMI) is ongoing. The achievement is getting closer.
    - Higher-power laser will be installed soon.
    - etc.
  - Some level of cryo-cooling has already taken place.
- **Bad news**
  - Bad weather:
    - Closure of the road to the observatory due to heavy snow (resolved)
    - Increased ground vibration in low frequency every winter season due to the rough seas in the nearby area of KAGRA.
  - Accident:
    - In December, an instantaneous power failure occurred over a wide area that included KAGRA.

## Timeline

- **1<sup>st</sup> observation (1-3 Mpc) in the first 1 month of O4a**
  - Partial operation of cryo-coolers for test mass mirrors. (81K at ETMX/Y, 250K at ITMX/Y)
- **1<sup>st</sup> mid-break**
  - Take a longer commissioning break to improve the detector's sensitivity.
- **2<sup>nd</sup> observation ( $\approx 10$  Mpc) in the spring of 2024**
  - Resume the observation, 3 months-length at least.
  - Cooling the test mass mirrors  $< 100$  K at least. (20K supposing full operation of cryocoolers)
- **2<sup>nd</sup> mid-break,**
- **3<sup>rd</sup> observation ( $\geq 10$  Mpc) at the end of extended O4.**
  - Take another commissioning break to run several months of observation with higher sensitivity. (Still uncertain)

