

# 100-m Laser Strainmeter

## for Geophysical Observations

### Why in Kamioka mine ?

- 1000-m underground ..... Low background vibration  
Stable temperature
- Hard basement rock ..... Stable long-term operation  
(Hida gneiss)
- Atotsugawa fault ..... Geophysical signals (strain drift  
and steps caused by fault motion)

### Targets

- Earth's free oscillation ..... Earth's background free oscillation,  
Core modes,  
Outer-core resonances, etc.  
( $10^{-13}$  at 0.1~10mHz)
- Fault monitor with an absolute-length interferometer  
..... Exact determination of strain drift
- Baseline monitor for the CLIO interferometer

### Tools

- L-shape interferometer ..... Reduction of barometric noise
- Iodine-stabilized Nd:YAG laser (532nm)  
..... Stability :  $<\sim 10^{-13}$  at  $<0.1$ Hz
- Absolute-length interferometer  
..... Resonant-sideband method  
L~0.1 $\mu$ m, L=100m  
(Accuracy  $\sim 10^{-9}$ )