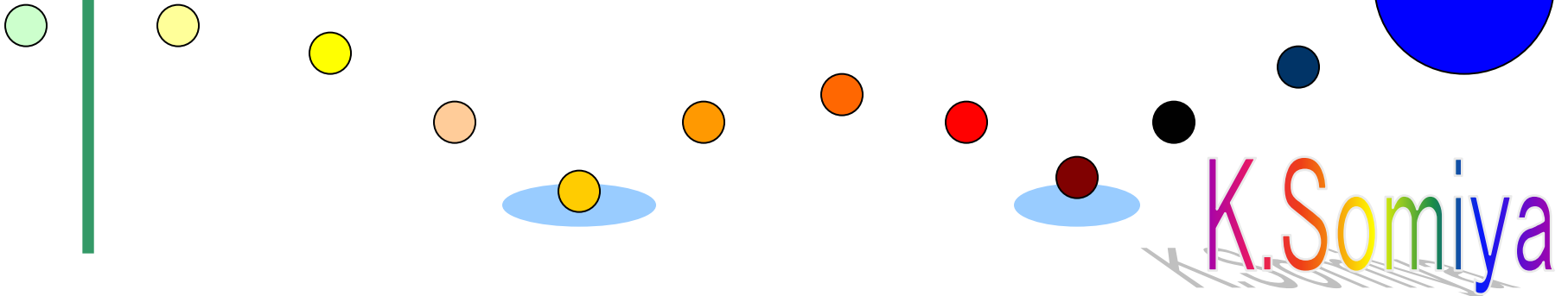




**IOO**

**LCGT f2f meeting  
Aug. 2012**

*Tokyo Inst of Technology*  
**Kentaro Somiya**

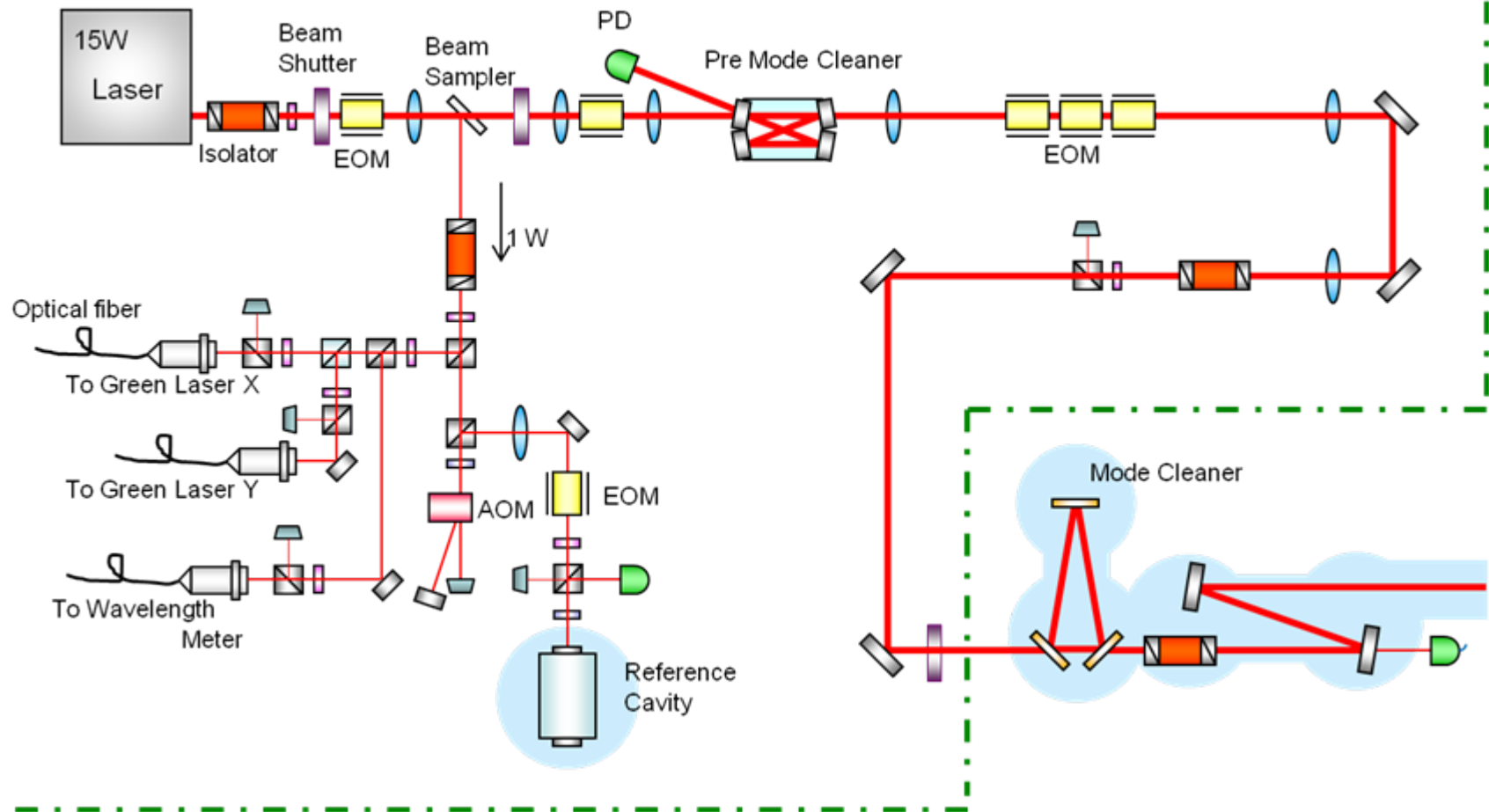


# Input optics

# IOO 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)  
K. IZUMI (U-Tokyo)  
K. SOMIYA (TITech)  
T. AKUTSU (NAO)  
E. HIROSE (ICRR)  
S. NAGANO (NICT)  
S. SAKATA (UEC)  
M. MUSHA (UEC)

# Schematic view



# Output optics

# Output mode-cleaner

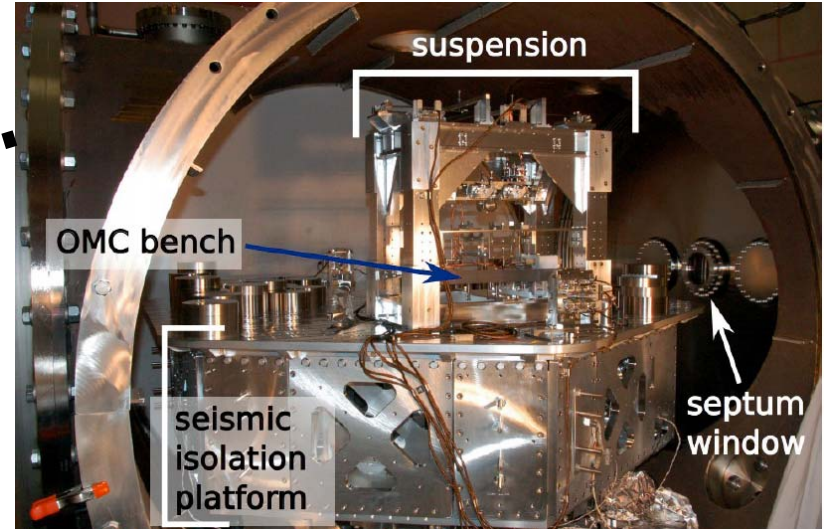
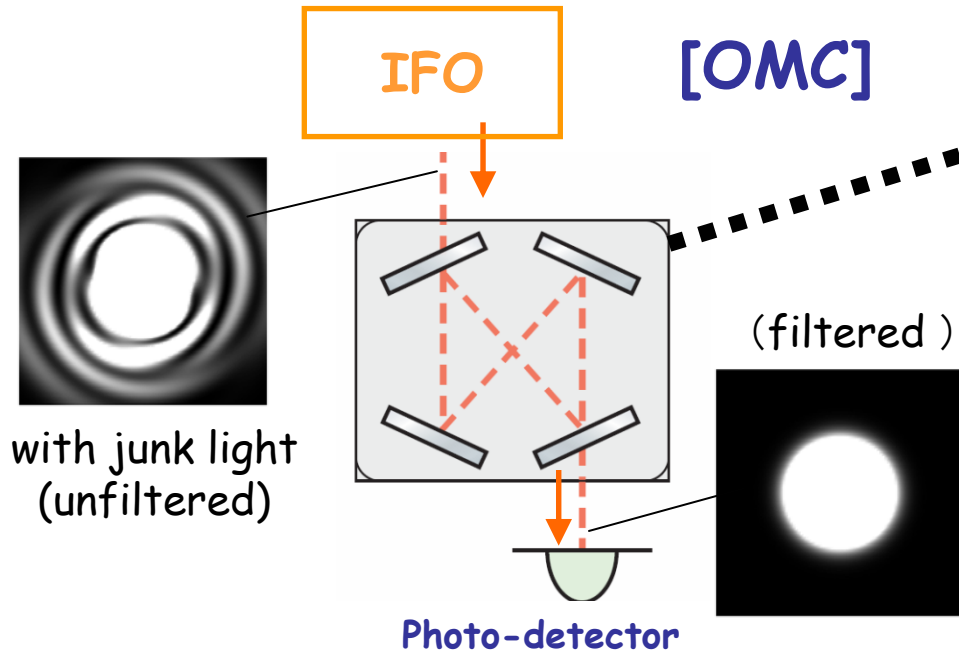


Photo from LIGO

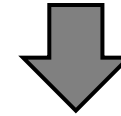
- OMC filters out higher-order spatial modes
- OMC filters out RF SB not used for DC readout
- OMC transmits DC light (offset + loss imbalance) used as the reference for DC readout

# OMC design

FINESSE is used for the calculation

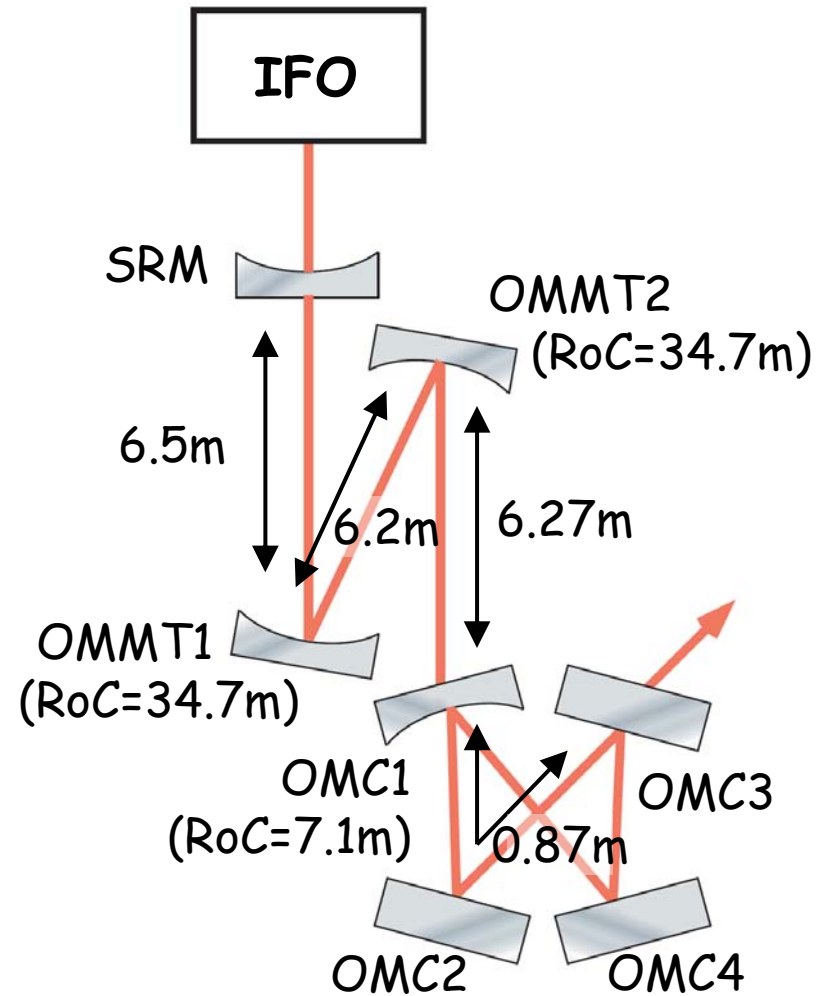
before OMC

RF	DC					
total	TEM00	TEM20	TEM02	TEM40	TEM04	TEM22
85mW	1.0mW	8.9mW	8.9mW	30uW	30uW	20uW

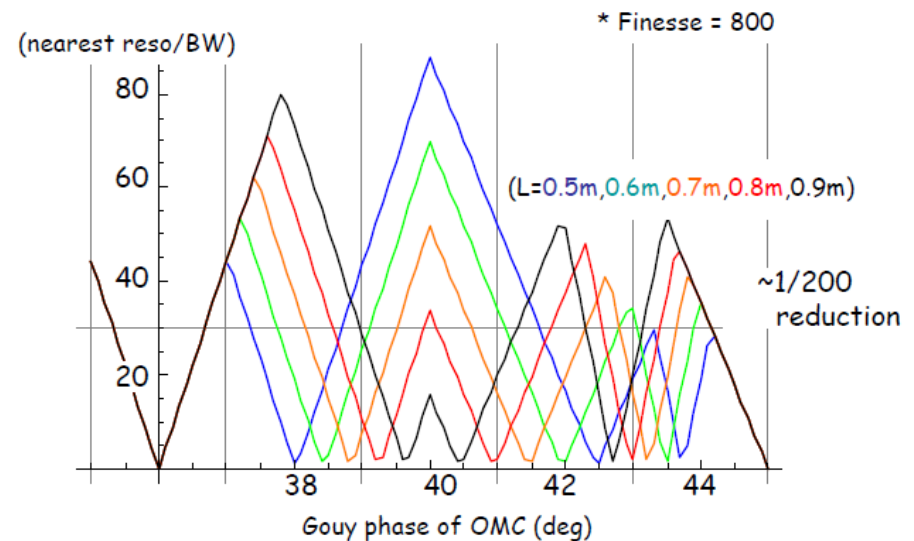


after OMC

RF	DC					
total	TEM00	TEM20	TEM02	TEM40	TEM04	TEM22
4uW	980uW	0.1uW	0.1uW	0.1nW	0.2nW	0.1nW

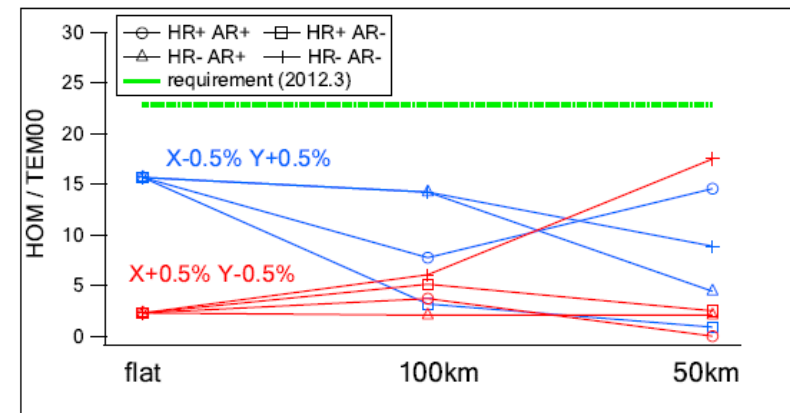
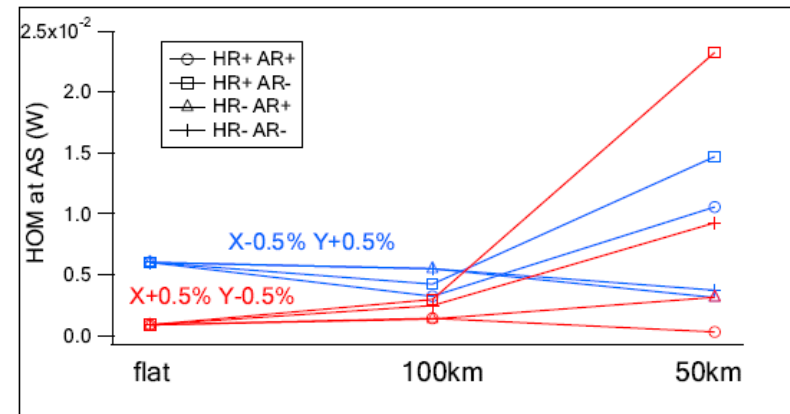


Reflectivity of OMC1 and OMC3 is 99.6%



# Updates on OMC & HOM calculation

- Mirror curvatures in the main IFO have been modified
- Calculation accuracy has been increased
- Lensing due to BS RoC error has been calculated and the requirement has been given
- Fine tuning of the OMC parameters will be done with the new setup
- Table-top control experiment OMC will be started at Tokyo Tech this year





# OMMT and OFI

- Output mode-matching telescope RoCs have been determined
- Requirement of the OMMT movable range will be given soon
- Mike Smith pointed out that we need an output Faraday Isolator between SRM and OMMT1
- Optical loss of FI can be a few percent (0.5% for the crystal); in total, ~5% in the output system, and then ~5% at a photo-detector will be a requirement.

**End**