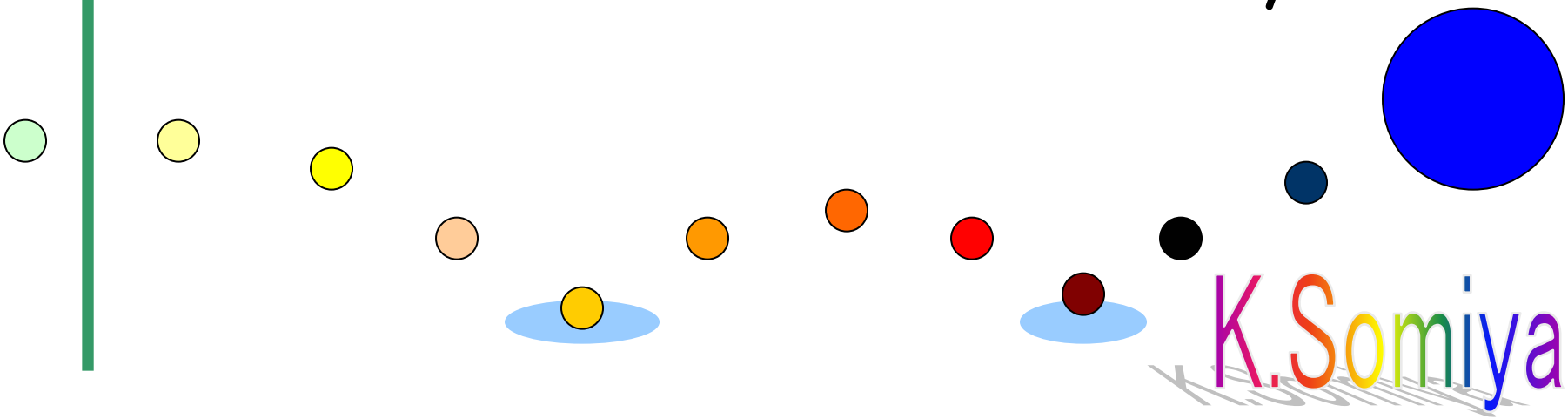
IOO

LCGT f2f meeting
Aug. 2012

AIST[1] and Tokyo Tech[2]
Souichi Telada[1] and Kentaro Somiya[2]



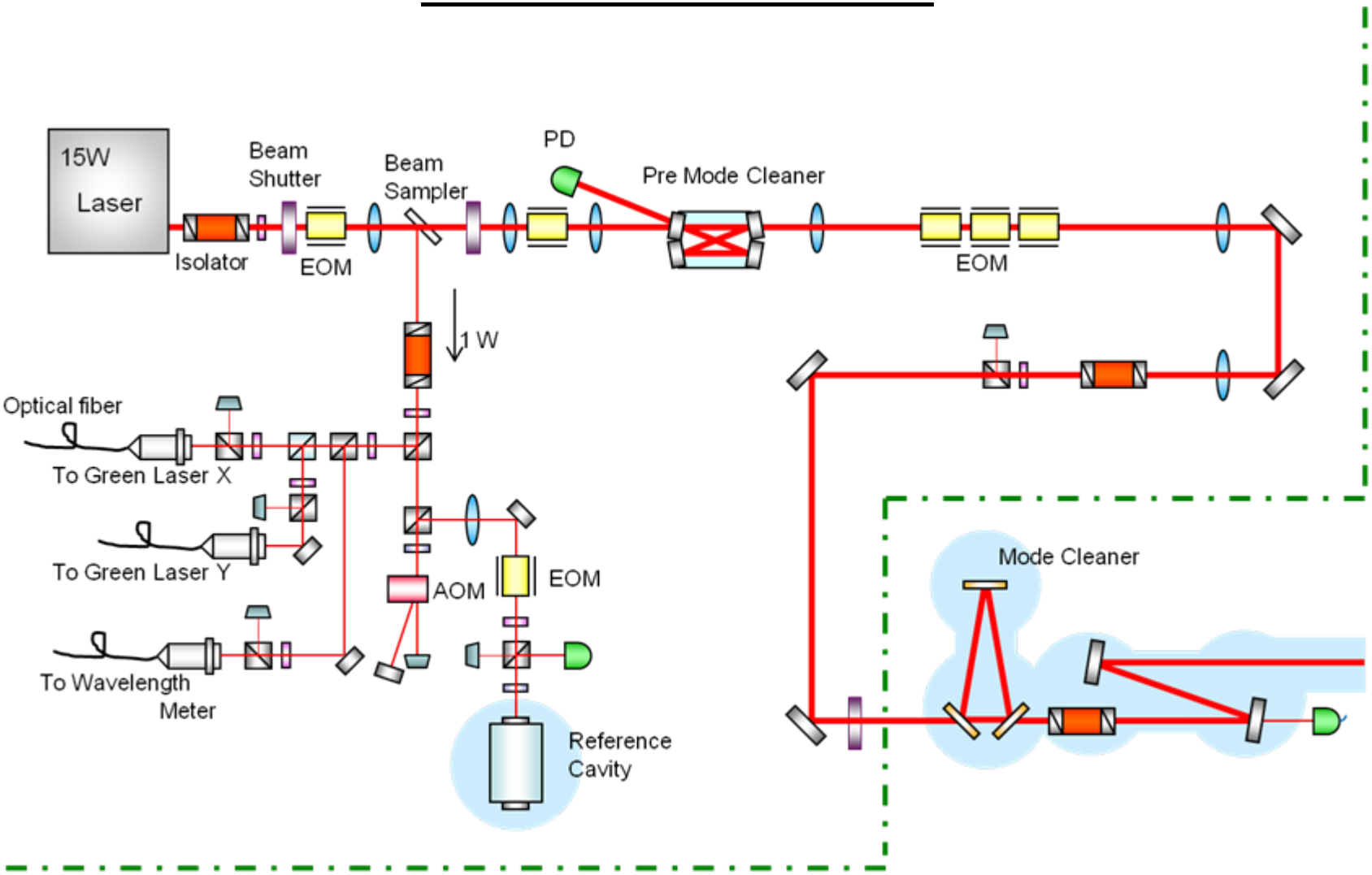
Input optics

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)

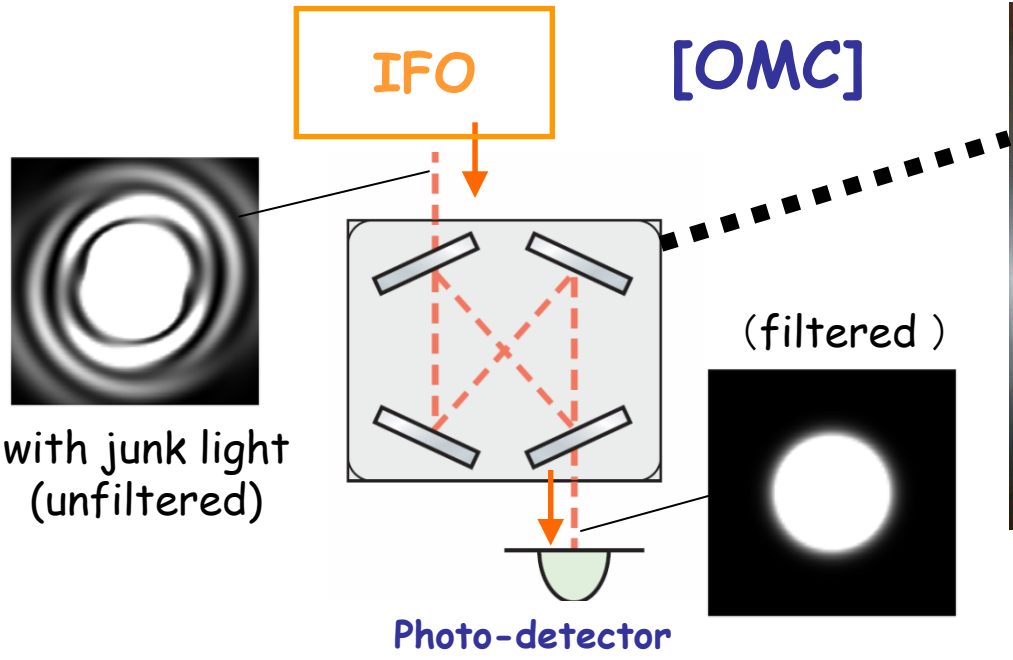
Contact: Souichi TELADA <souichi.telada@aist.go.jp>

Schematic view



Output optics

Output mode-cleaner



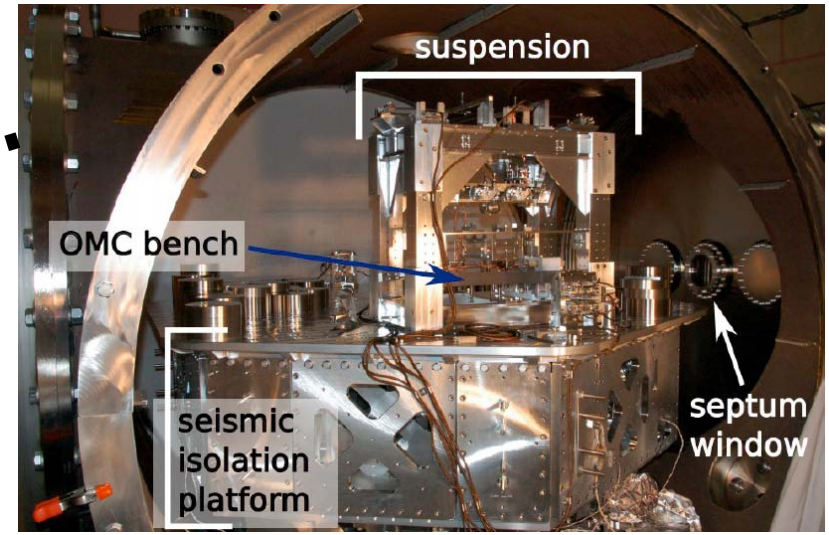
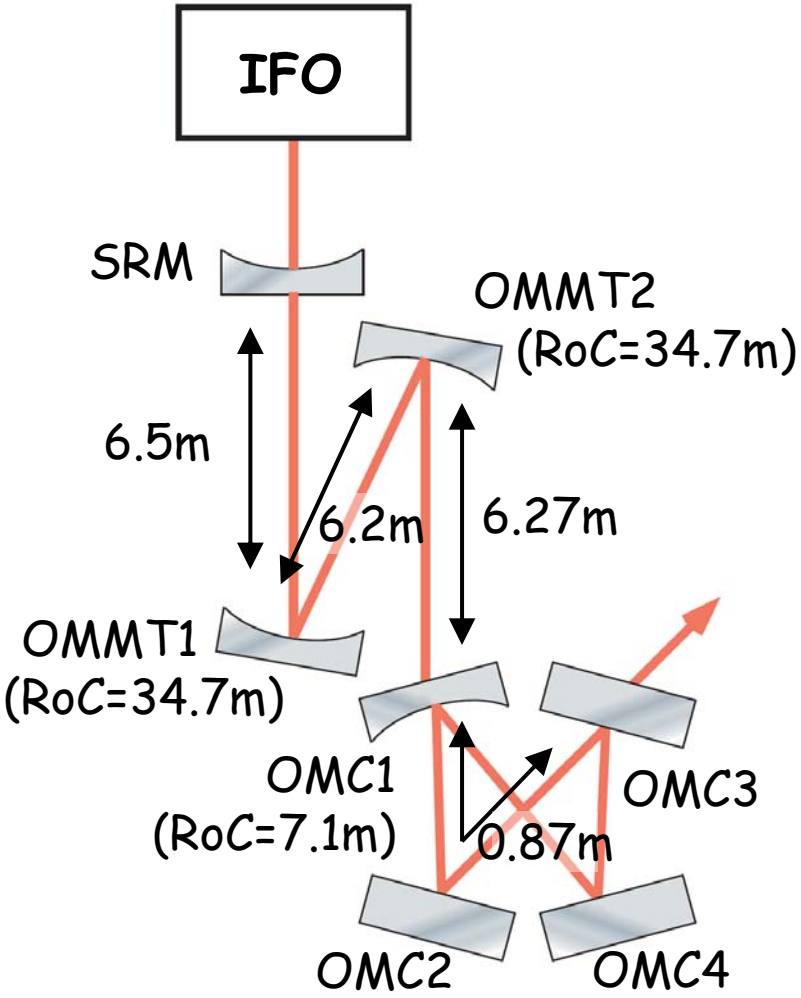


Photo from LIGO

- 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

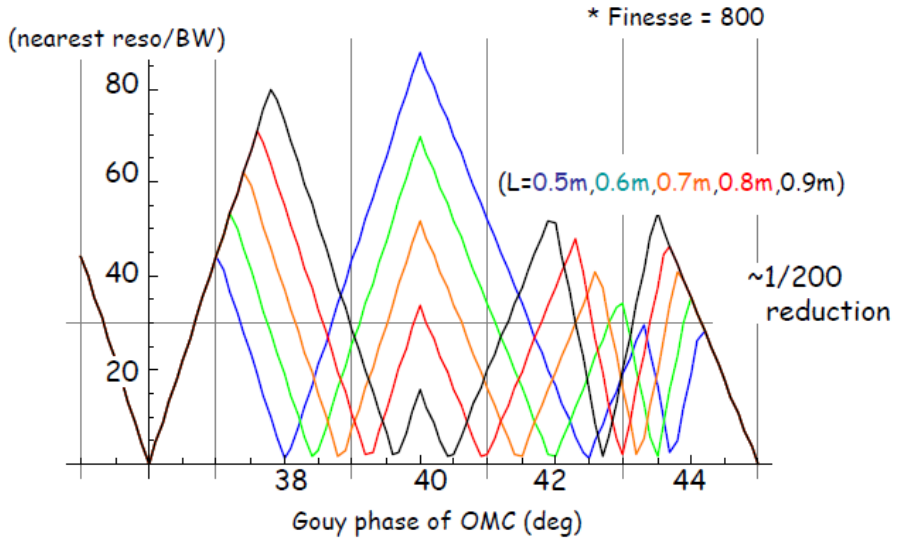


before OMC

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

after OMC

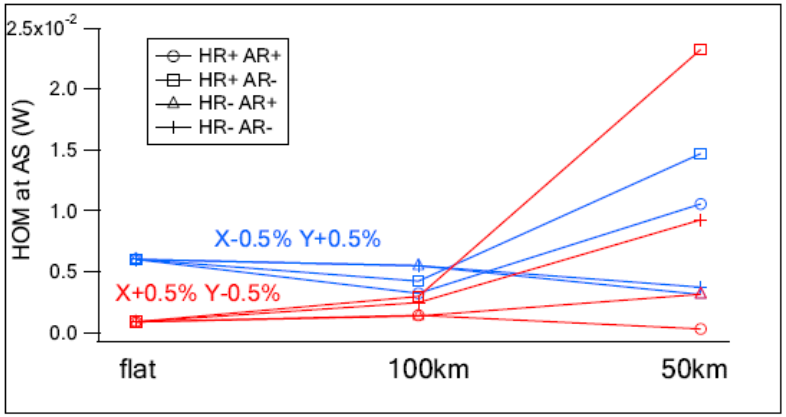
RF	DC					
total	TEM00	TEM20	TEM02	TEM40	TEM04	TEM22
4uW	980uW	0.1uW	0.1uW	0.1nW	0.2nW	0.1nW

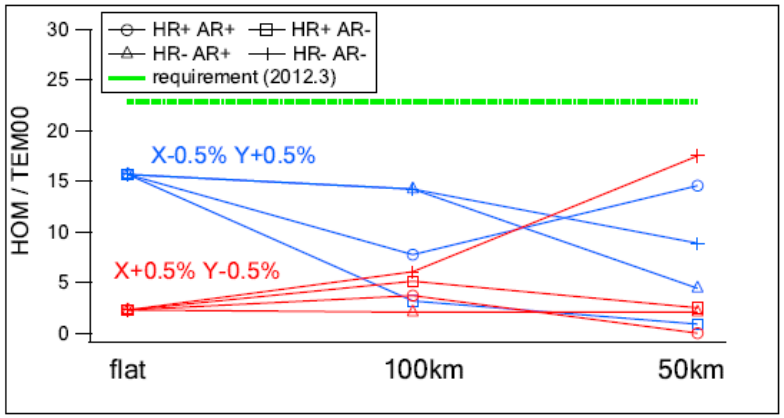


Reflectivity of OMC1 and OMC3 is 99.6%

Updates on OMC & HOM calculation

- Mirror curvatures in the main IFO have been modified
- Calculation accuracy has been increased and BS RoC error has been taken into account
- Updated parameters:
  OMMT length = 4m
  OMMT RoC = 26.5m
  OMC length = 0.8m
  OMC1 RoC = 2.35m
- Tabletop control experiment OMC will be started at Tokyo Tech





Output Faraday Isolator

- Mike Smith pointed out that we need an output Faraday Isolator between SRM and OMMT1 to avoid back scattering.
- Optical loss of FI can be a few percent; 0.5% for the crystal and 1~2% for PBS.
- In total, ~5% loss in the output system, besides ~5% loss at PD (requirement).

End