

# Wavefront in the MTW Grating Compression Chamber

The MTW wavefront is measured by a wavefront sensor WFS (see Fig. 1) installed behind the leaky mirror LM2 in the backward direction. This measurement requires careful calibration of non-common-path wavefront aberrations in the diagnostic path, and a determination of the single-pass contribution through the compressor. First, a flat mirror is installed at the grating compression chamber (GCC) input and a cw probe laser with a 50% splitter in front of the WFS calibrates the down-collimator while the MTW beam is blocked. Next, the flat mirror is moved to just before the off-axis parabola and the wavefront of the probe beam is measured for two passes of the GCC. For a single pass, the wavefront error is only  $0.075\lambda$  (p-v) over the full beam aperture. Finally, the wavefront of the MTW beam is measured for a double-pass through GCC by the same wavefront sensor. A typical MTW wavefront for a double-pass through GCC is shown in Fig. 2 and has a p-v variation of  $0.15\lambda$  over 98% of the MTW beam.

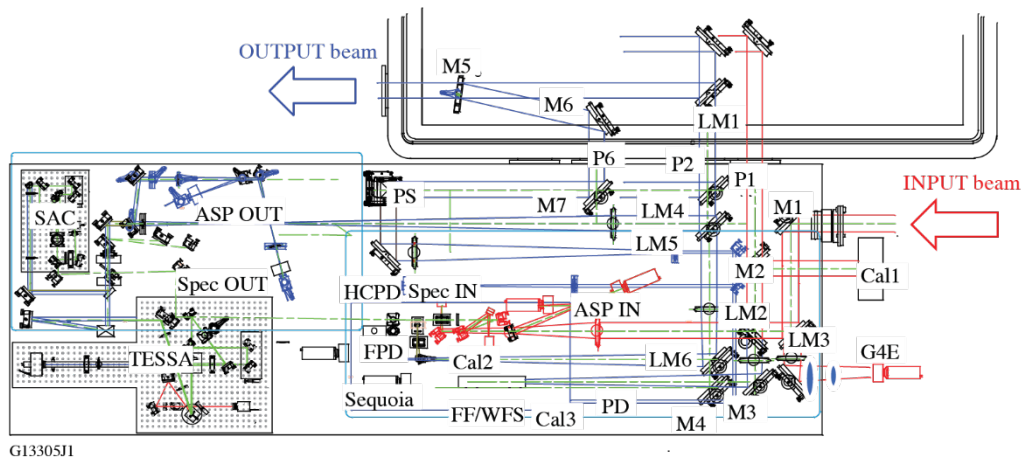


Fig. 1. Compressor diagnostic package. M: mirror; LM: leaky mirror; P: port; Cal: Calorimeter, Spec: spectrometer; PD: photodiode; HCPD: high-contrast photodiode; FPD: fast photodiode; FF: far-field camera; ASP: alignment spatial package; WFS: wavefront sensor; PS: periscope; G4E: grating 4 equivalent; TESSA: time-expanded single-shot autocorrelator; SAC: scanning autocorrelator.

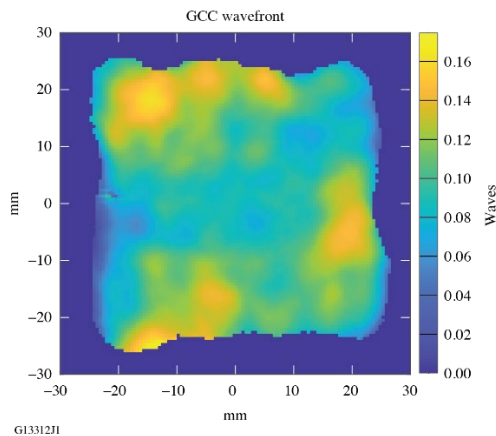


Fig. 2. MTW output wavefront with the output phase modulation about  $0.15\lambda$  (p-v).