Tolerance of LLT: Latest Thoughts(Red)

- Two different types of tolerance were done: 1) RMS wavefront error is performance metric and 2) SA, Coma & Astig using Zernike polynomials assuming that all the wavefront errors can be represented by wavefront errors in exit pupil

- Perturbations including 2mm longitudinal/lateral movement of lens; 20 um longitudinal movement of PM; ,100um lateral movement of SM and angular perturbations of all elements has but a small effect on RMS wavefront error ($\Delta=0.1385\lambda$-slide4)/SA ($\Delta=0.0002\lambda$) all of which can be compensated by defocus of SM.

- *Note including tolerances for changes in lens' radii, thickness, indices, test-plate fitting, figure irregularity increases the RMS wavefront error ($\Delta=0.6334\lambda$)- to 0.6473 λ. In this case figure irregularity(default=1fringe) and test plate fitting power were the biggest contributor to RMS wavefront error. Even if the longitudinal spacing of lens is changed from 2mm to 10mm the effect on SA is very small (0.0001λ)*

Aberration	Design (_)	Design + Tolerance (_)
Spherical	0.0138	0.0157
Coma (include trefoil)	0.0	0.5249
Astigmatism	0.0	0.6050

- *Perhaps slight manufacturing error is the cause of increased Sph Aberration; increasing figure irregularity from 1 to 2 fringes irregularity increase RMS wavefront error to 0.8644. Also if the incoming beam to LLT is off by even an arcminute, it has a detrimental effect on RMS wavefront error.*