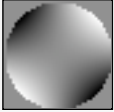
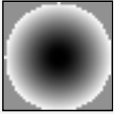
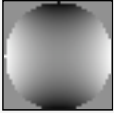
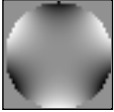
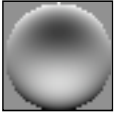
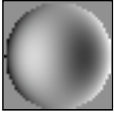
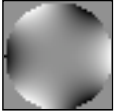
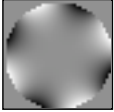
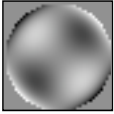
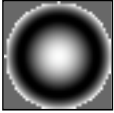

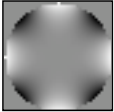


Table 1. Zernike polynomials in the second through fourth orders.

Zernike order	Zernike mode	Description	Polynomial term (polar)	Shape/map
2	Z_2^{-2}	oblique astigmatism	$\sqrt{6}\rho^2 \sin 2\theta$	
2	Z_2^0	spherical defocus	$\sqrt{3}(2\rho^2 - 1)$	
2	Z_2^2	ATR/WTR* astigmatism	$\sqrt{6}\rho^2 \cos 2\theta$	
3	Z_3^{-3}	oblique trefoil	$\sqrt{8}\rho^3 \sin 3\theta$	
3	Z_3^{-1}	vertical coma	$\sqrt{8}(3\rho^3 - 2\rho)\sin\theta$	
3	Z_3^1	horizontal coma	$\sqrt{8}(3\rho^3 - 2\rho)\cos\theta$	
3	Z_3^3	horizontal trefoil	$\sqrt{8}\rho^3 \cos 3\theta$	
4	Z_4^{-4}	oblique quadrafoil	$\sqrt{10}\rho^4 \sin 4\theta$	
4	Z_4^{-2}	Oblique 2 nd order astigmatism	$\sqrt{10}(4\rho^4 - 3\rho^2)\sin 2\theta$	
4	Z_4^0	spherical aberration	$\sqrt{5}(6\rho^4 - 6\rho^2 + 1)$	
4	Z_4^2	WTR/ATR* 2 nd order astigmatism	$\sqrt{10}(4\rho^4 - 3\rho^2)\cos 2\theta$	
4	Z_4^4	quadrafoil	$\sqrt{10}\rho^4 \cos 4\theta$	

ATR = against the rule (maximum positive wavefront error at 180 degrees)

WTR = with the rule (maximum positive wavefront error at 90 degrees)