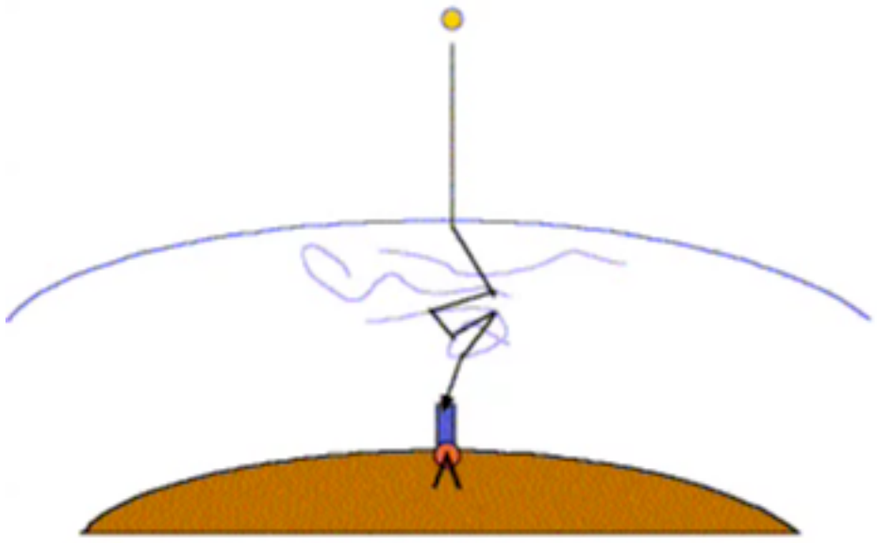
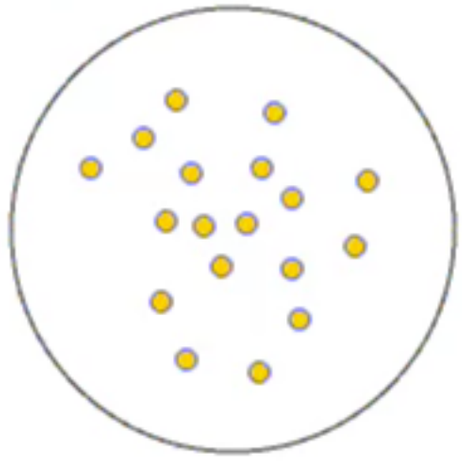
ASTR 555

Feb 1 2018

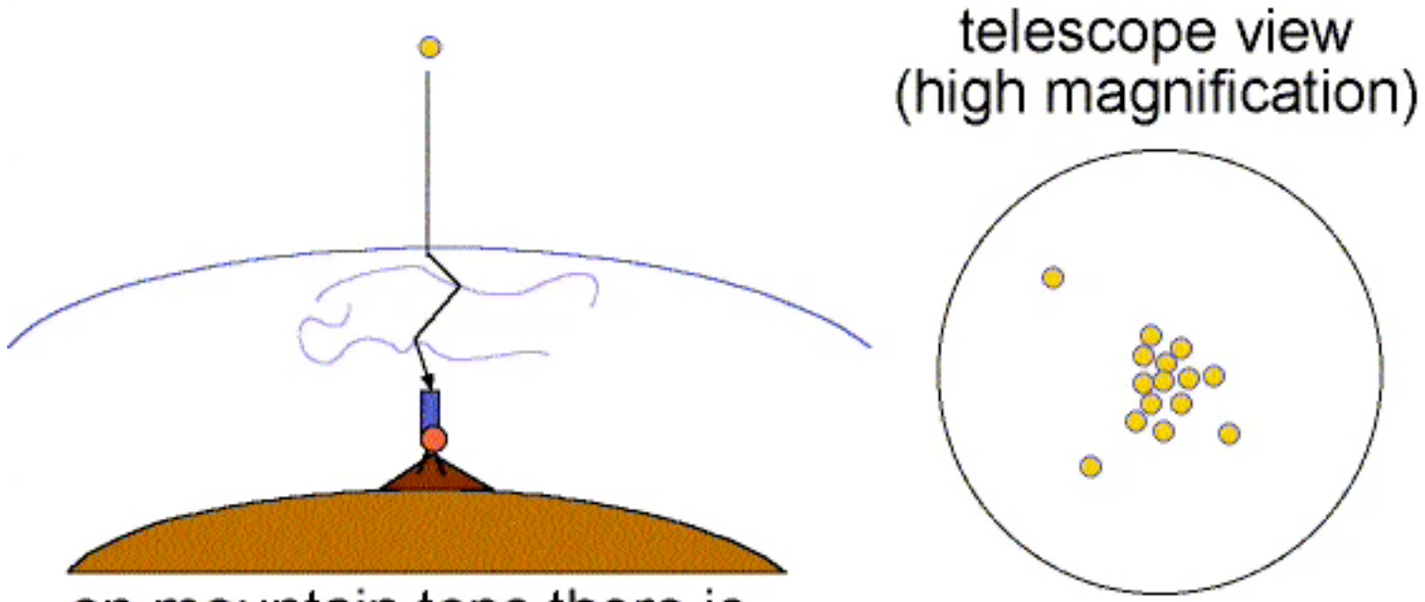


atmosphere refracts starlight in random directions very quickly—stars “twinkle”.

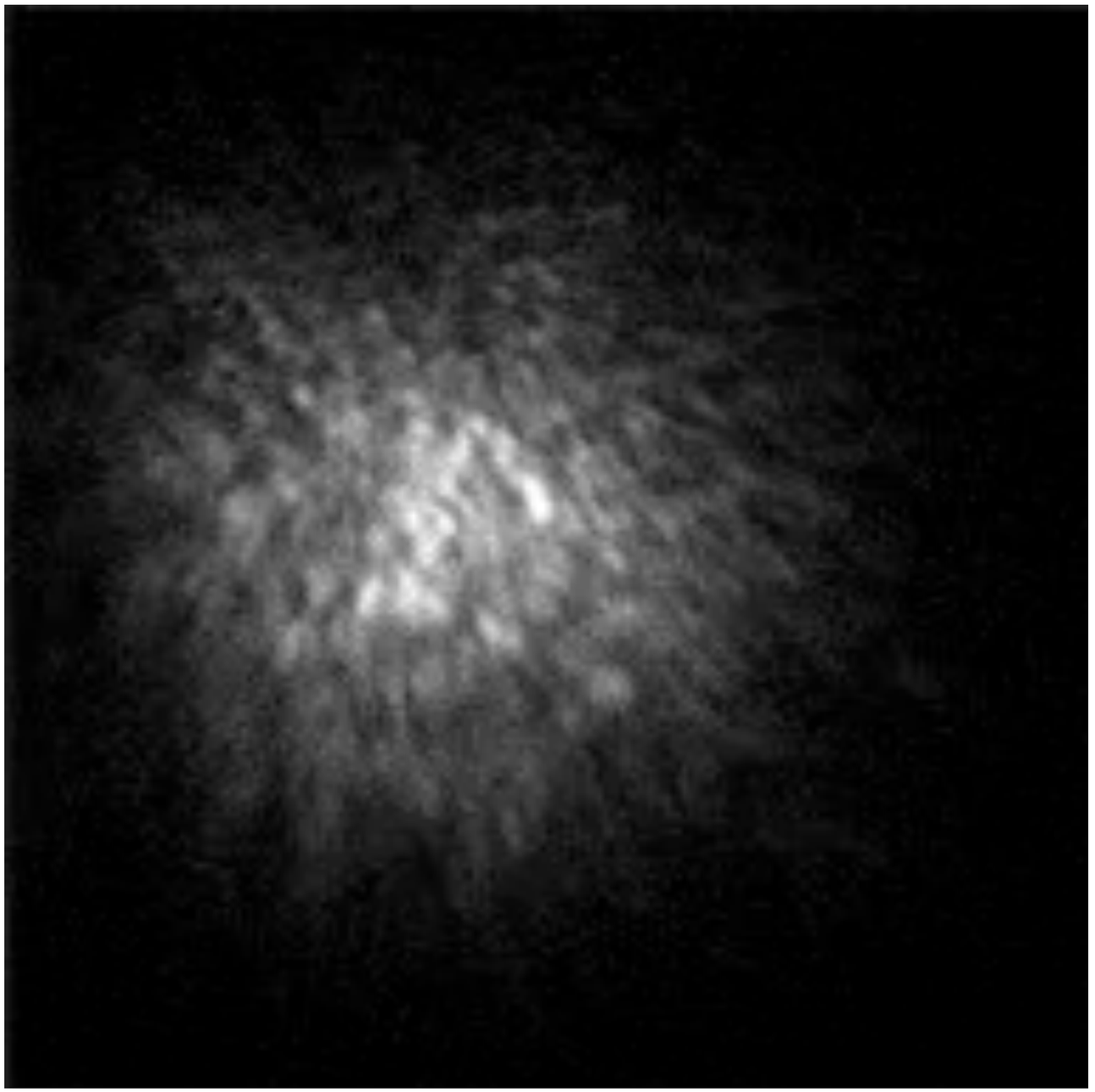
telescope view
(high magnification)

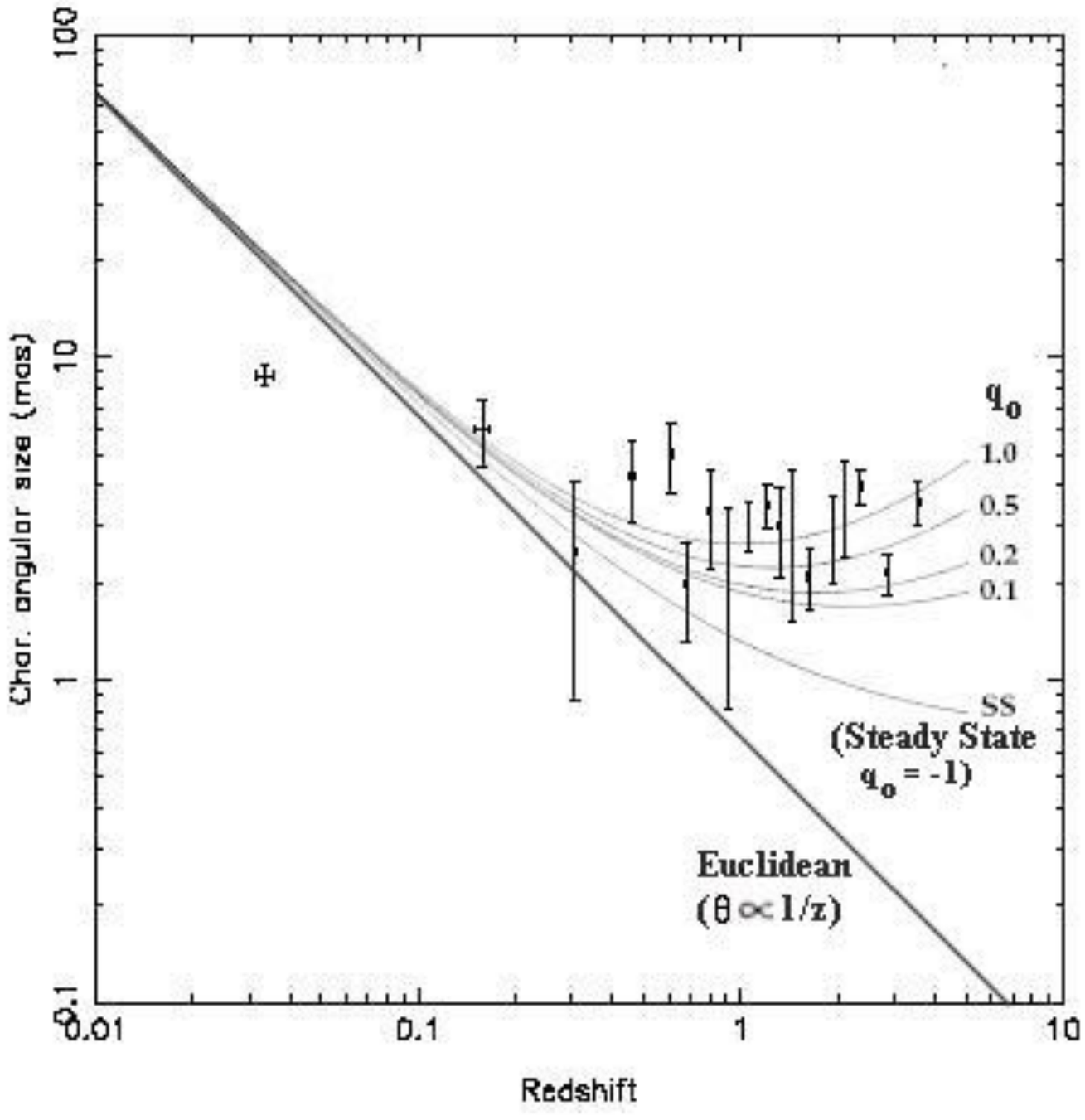


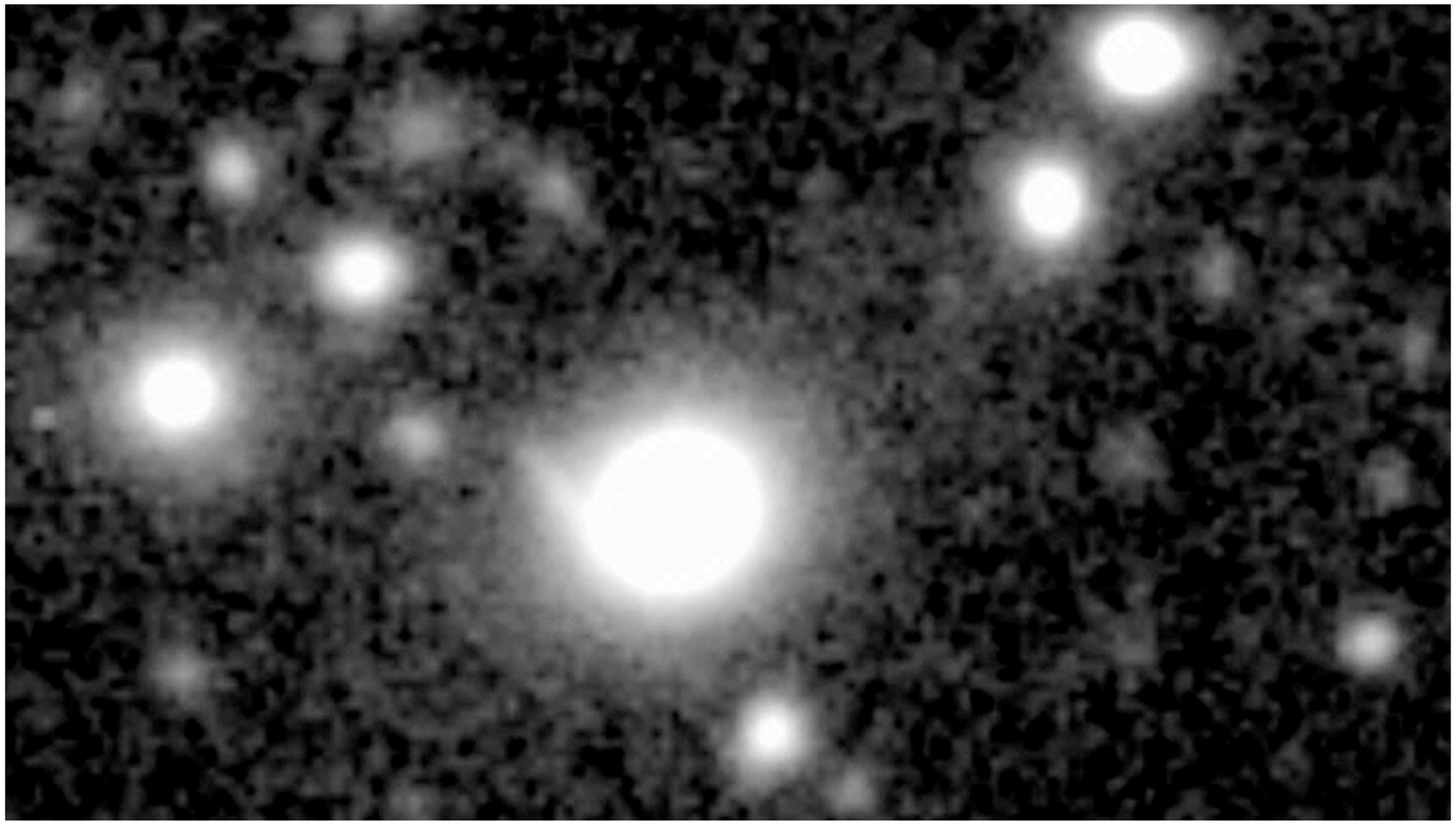
multiple images created

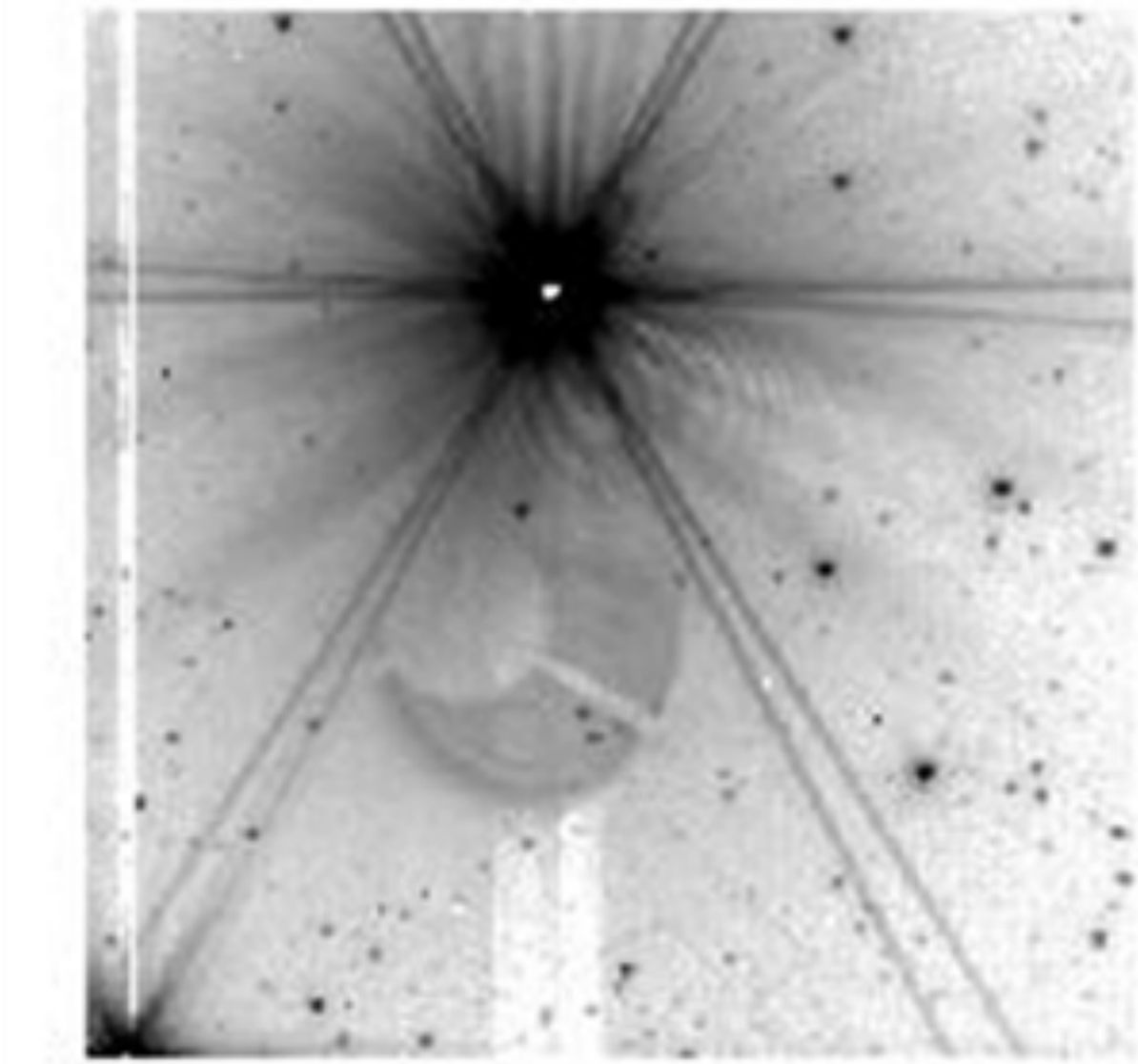


on mountain tops there is less atmosphere to look through—less distortion.



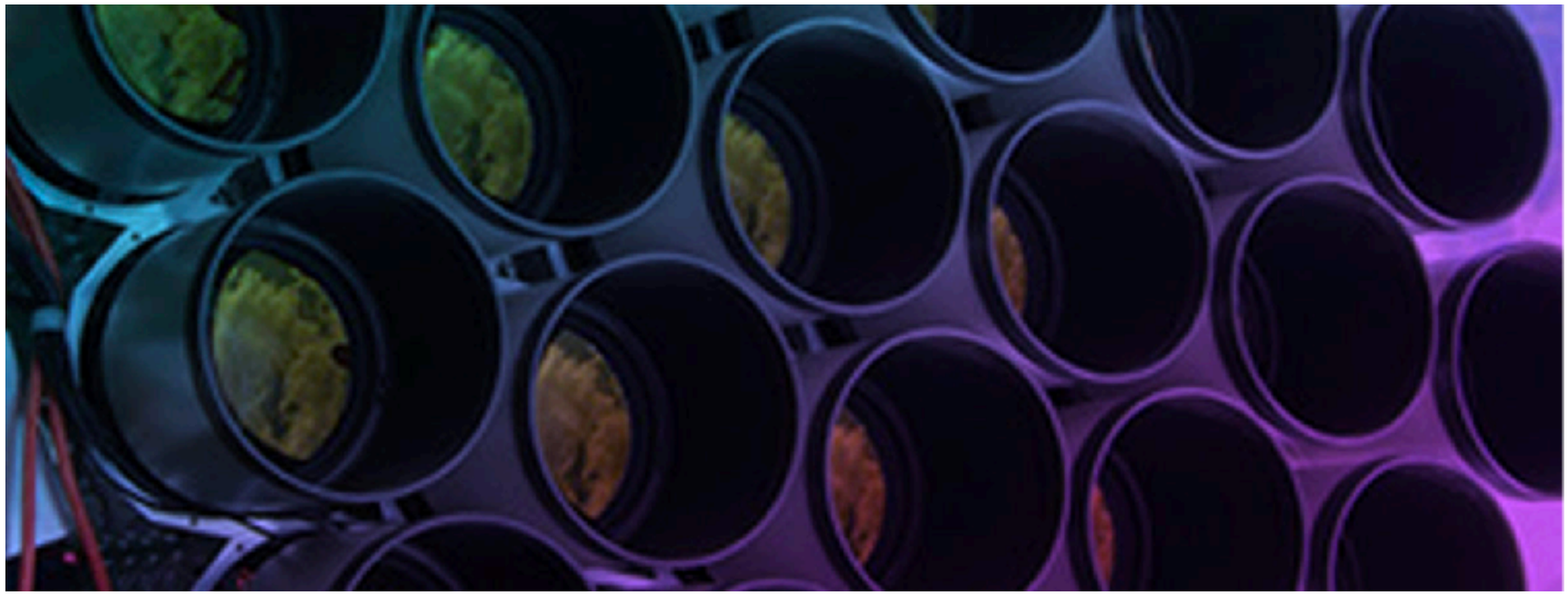

100
10
1
0.1
0.01
0.1
1
10
Char. angular size (mas)
Redshift
q_o
1.0
0.5
0.2
0.1
SS
(Steady State
$q_o = -1$)
Euclidean
($\theta \propto 1/z$)





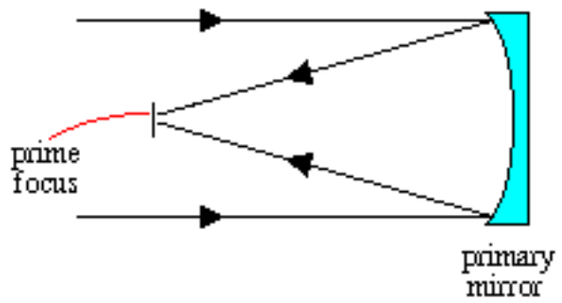
bright star in Spitzer/IRAC:
no atmosphere!

Dragonfly telescope: return to lenses

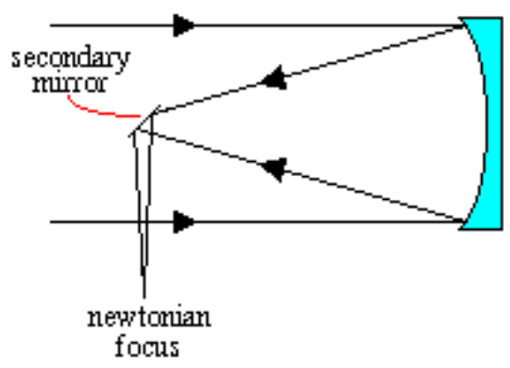


Reflecting Telescopes

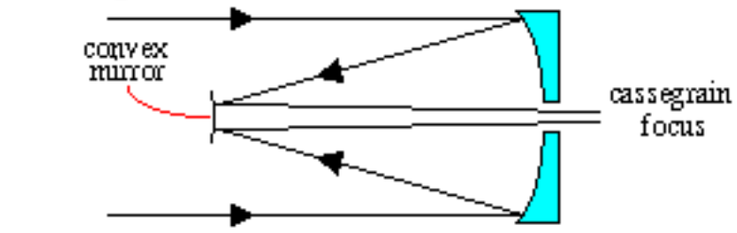
Prime



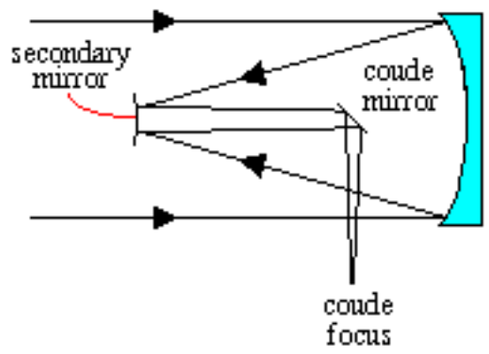
Newtonian



Cassegrain



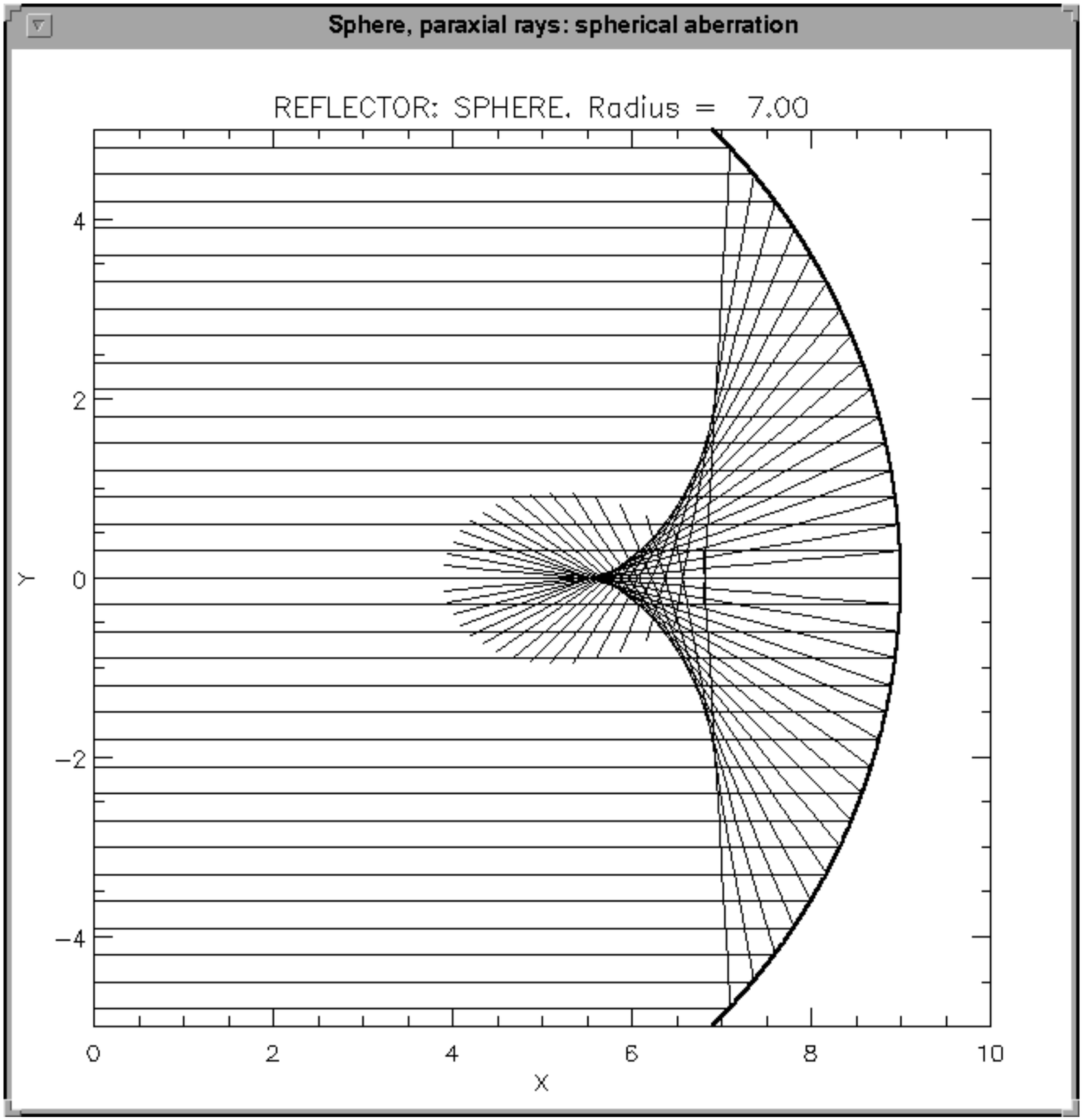
Coude



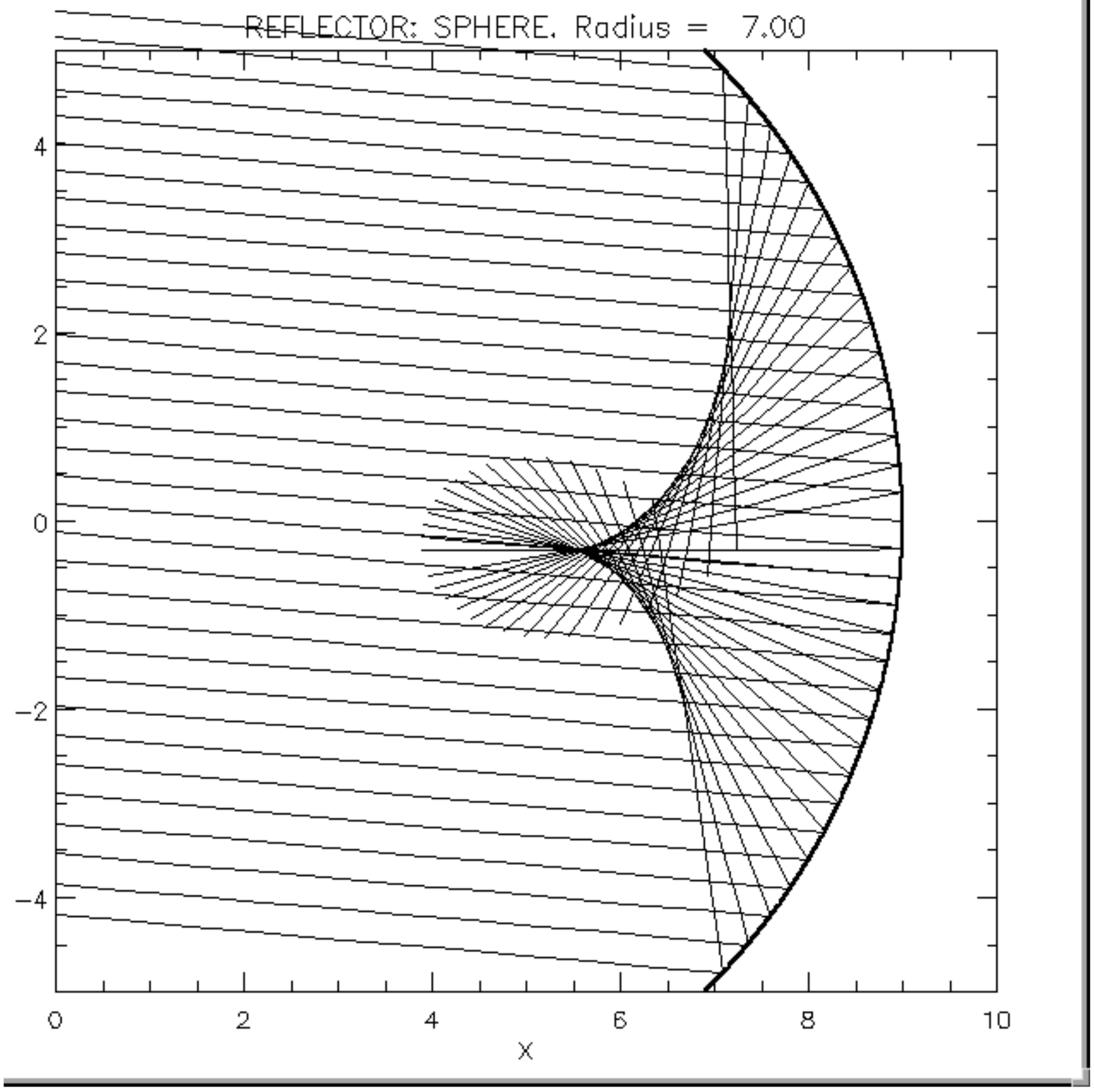
f/1.8 ($100,000,000)

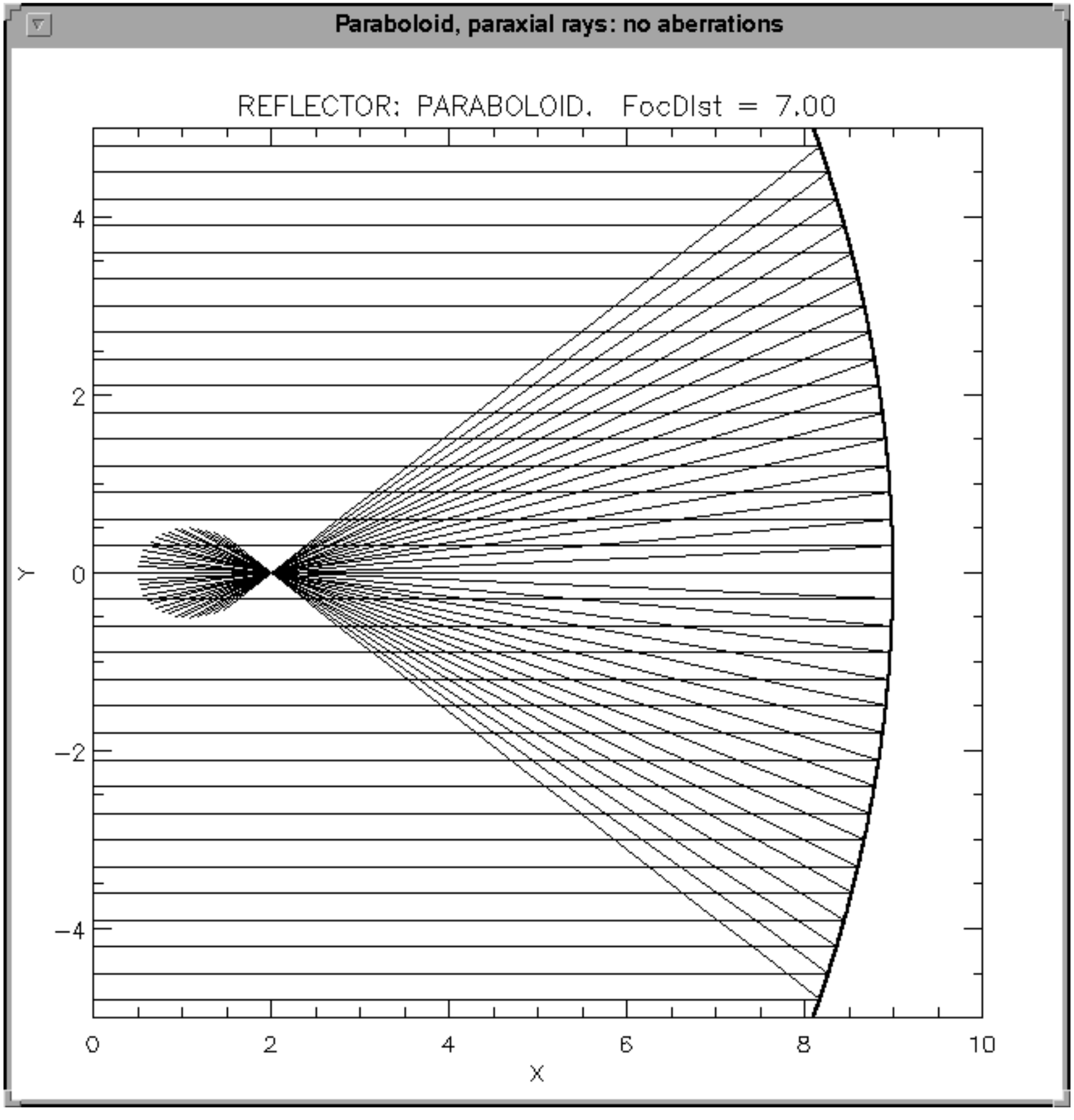
f/1.8 ($110)

Sphere, paraxial rays: spherical aberration

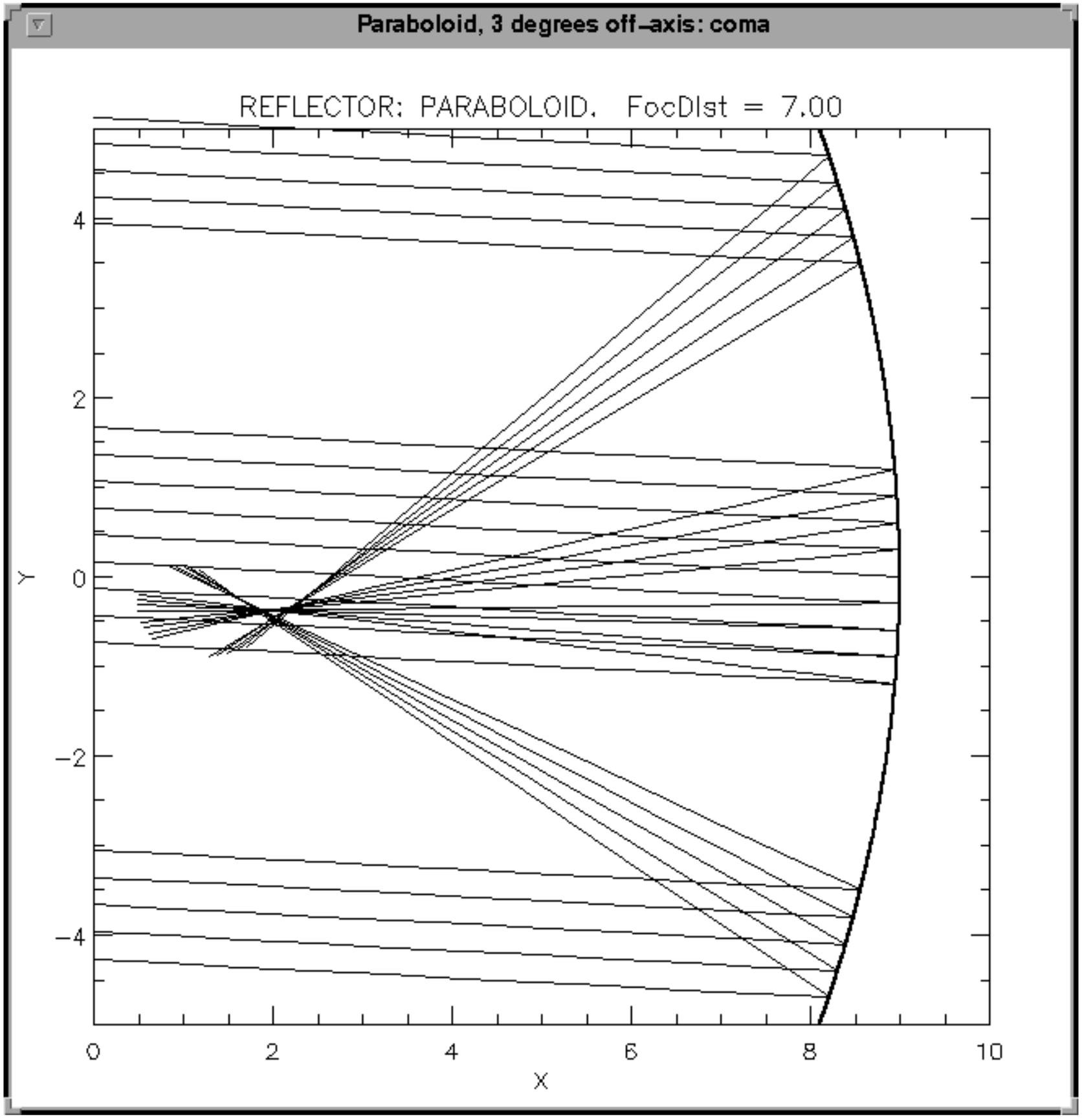


Sphere, 5 degrees off–axis: spherical aberration

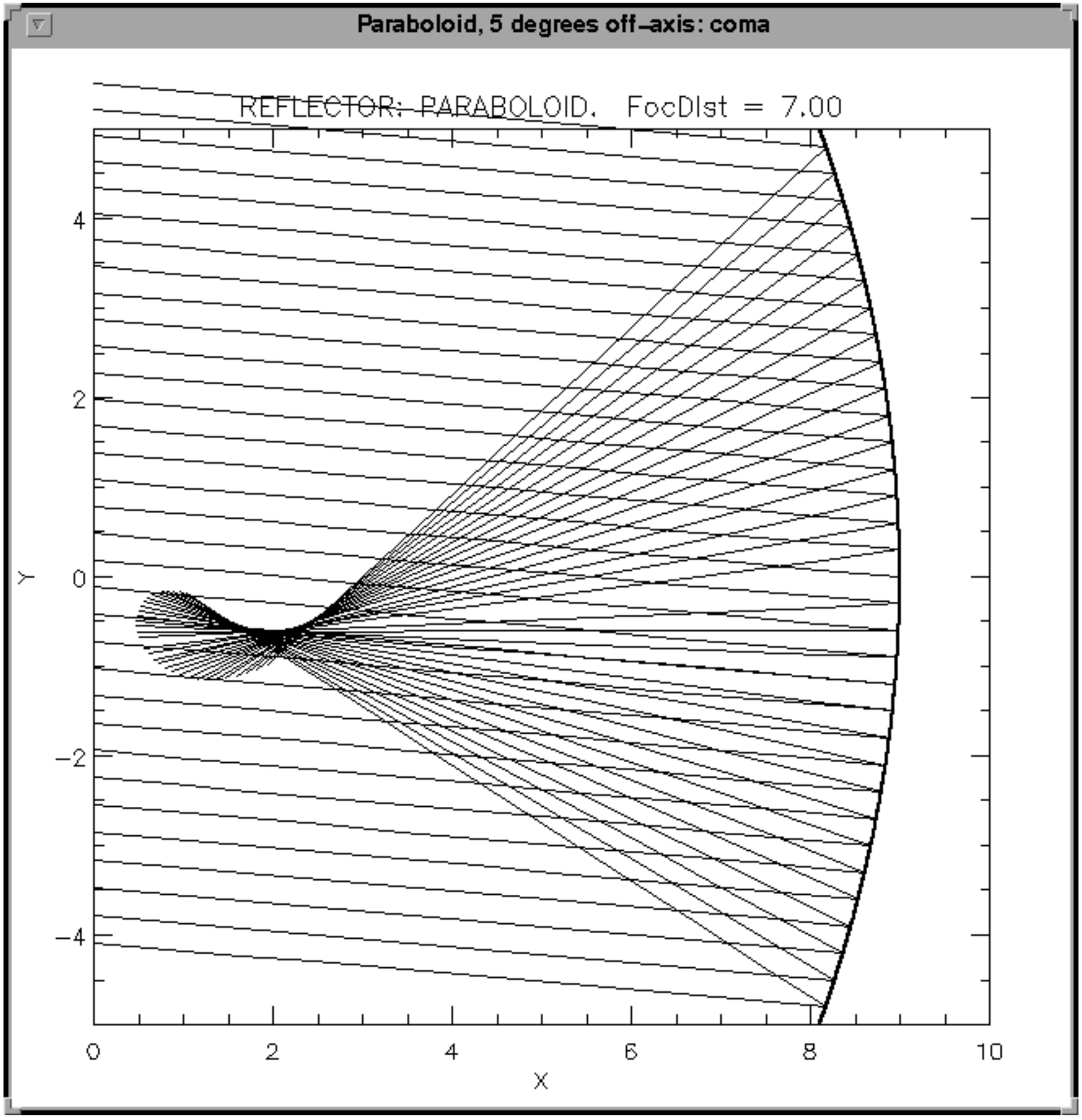


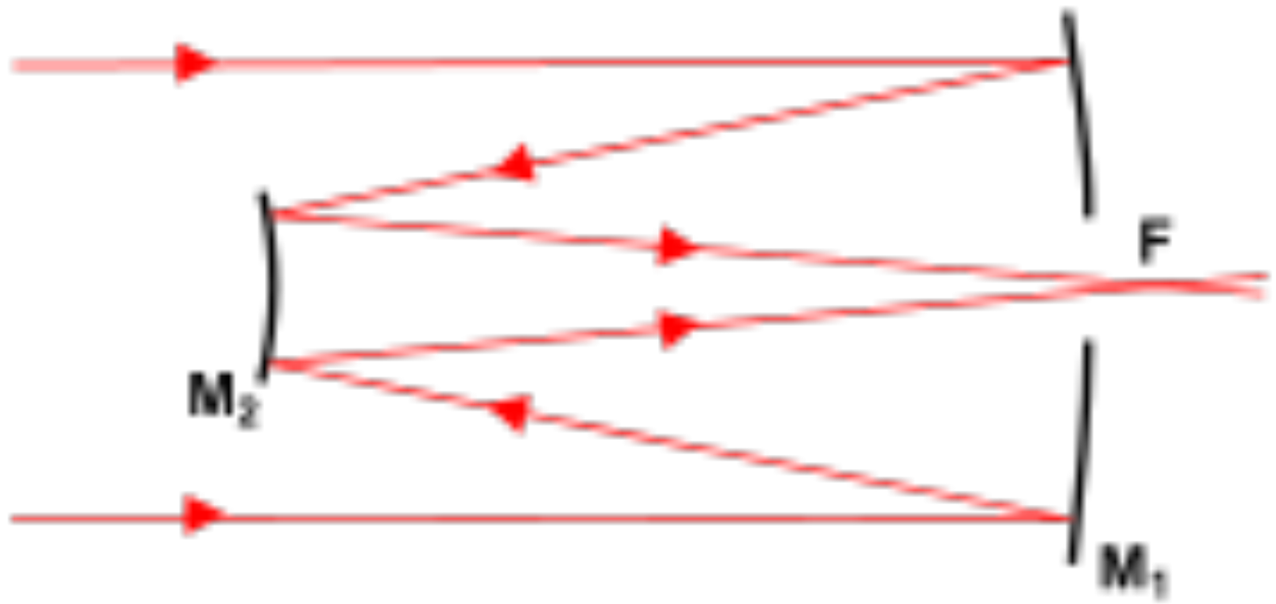

Paraboloid, paraxial rays: no aberrations
REFLECTOR: PARABOLOID. FocDist = 7.00
4
2
0
−2
−4
Y
0
2
4
6
8
10
X

Paraboloid, 3 degrees off-axis: coma



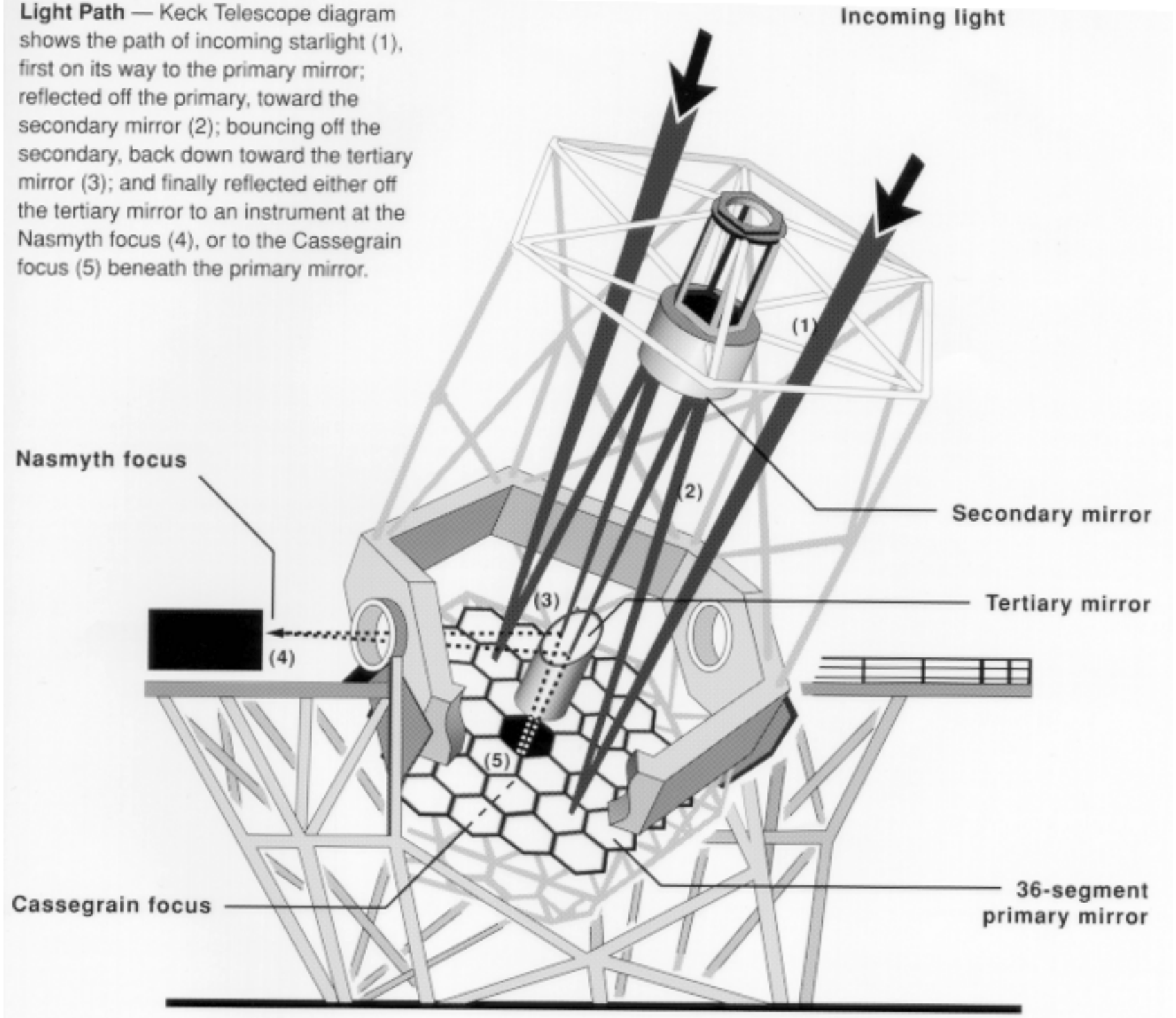
Paraboloid, 5 degrees off-axis: coma





Ritchey-Chrétien

Light Path — Keck Telescope diagram shows the path of incoming starlight (1), first on its way to the primary mirror; reflected off the primary, toward the secondary mirror (2); bouncing off the secondary, back down toward the tertiary mirror (3); and finally reflected either off the tertiary mirror to an instrument at the Nasmyth focus (4), or to the Cassegrain focus (5) beneath the primary mirror.



Credit: California Association for Research in Astronomy