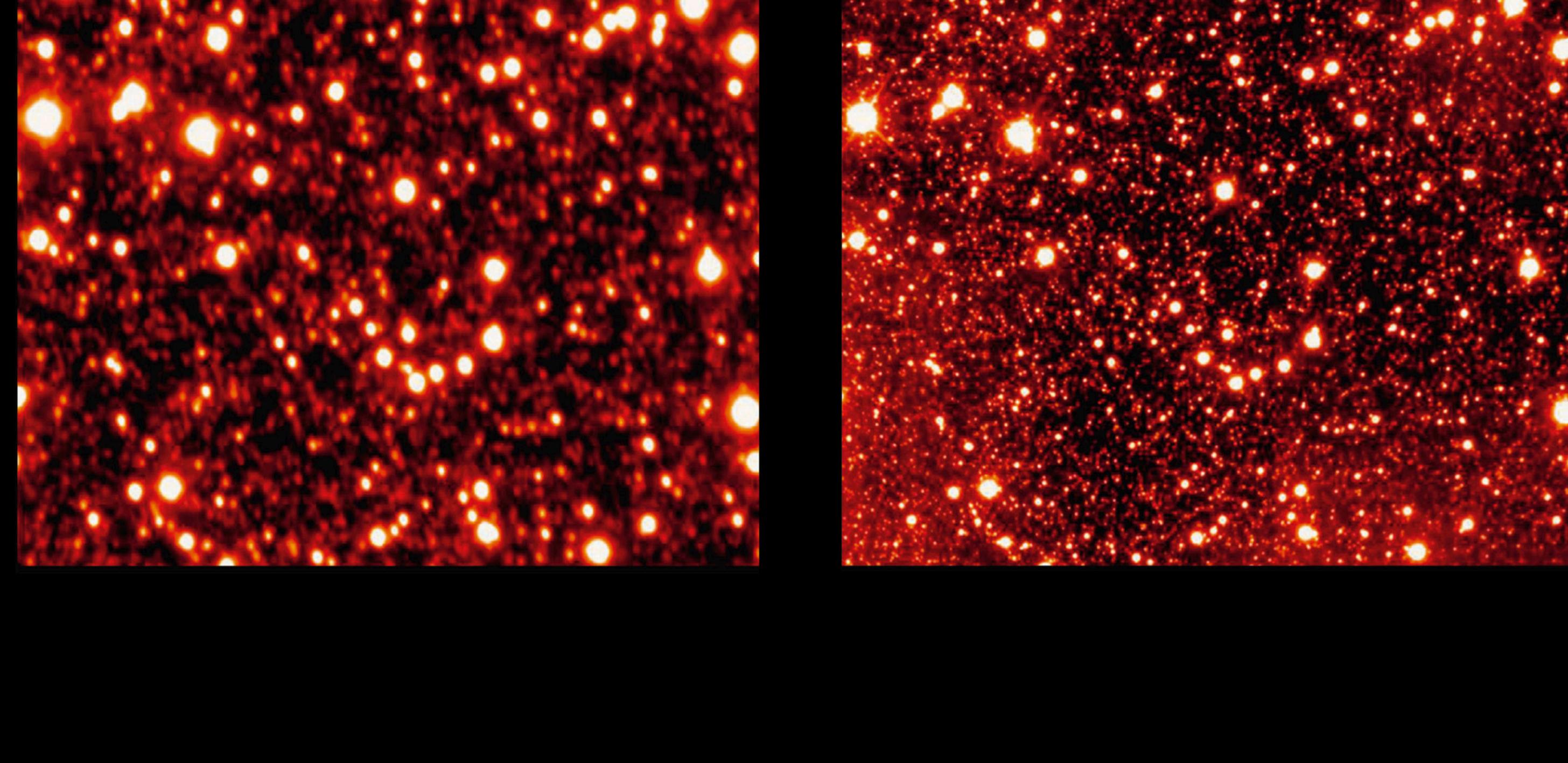


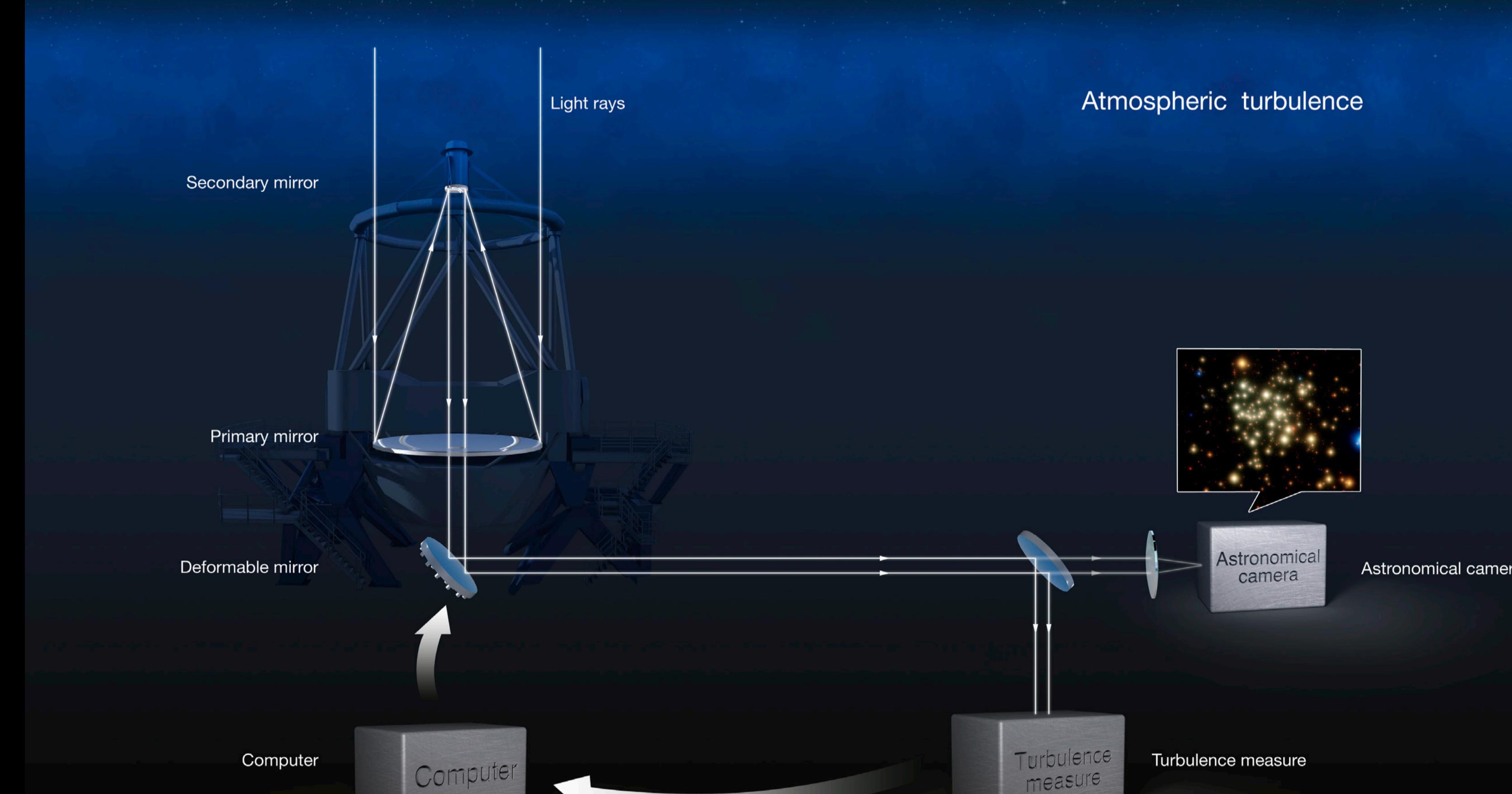
Adaptive Optics and Laser Guide Stars

Sophisticated computer-controlled deformable mirrors can correct the distortion caused by turbulence in the Earth's atmosphere, making ground-based images as sharp as those taken from space. This method is called adaptive optics and allows corrected systems to observe finer details in astronomical objects and also to observe much fainter objects from the ground than would otherwise be possible.

Adaptive optics requires a reference star that is very close to the object being studied. The star is used to measure the blurring introduced by the atmosphere so that the instrument can correct for it. As suitable stars are not always available in the right place on the sky, artificial guide stars are created by shining a powerful laser beam into the Earth's upper atmosphere to dramatically increase the fraction of the sky that can be observed with adaptive optics.



The globular cluster Omega Centauri before (left) and after (right) the adaptive optics system was switched on.



Illustrating the principle of adaptive optics.

