Meade Advanced Coma Free Optics

A breakthrough in the performance of serial telescopes

Why Meade ACF Optics?

- **Improved Sharpness in the field of view**
- **Higher Contrast in the field of view**
- **Higher limiting magnitude in the field of view**

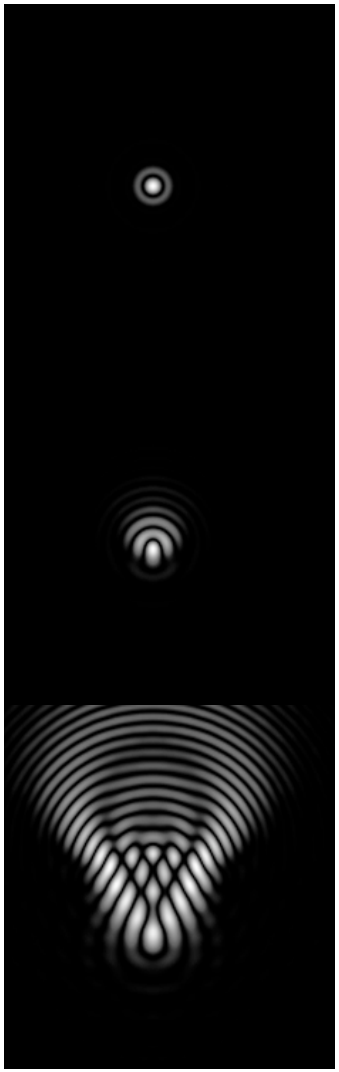
The two images on the left side were made by Bernd Koch with two 12“ Optics: a 12“ LX200GPS classical Schmidt-Cassegrain and a new 12“ LX200ACF. Those two telescopes have the same basic optical data and the image processing of both pictures was identical. Despite that fact the upper image, that was made with the ACF-optical system, shows smaller, round undistorted stars. The better image sharpness also affects the limiting magnitude: you can detect fainter stars in the upper picture.

What is Advanced Coma Free?

The Meade ACF-optical system has a great advantage when compared to conventional optics: it doesn´t have coma. Coma is a optical aberration that affects stars outside the middle of the image. The starlight is spread to form a cometlike tail. Meade Advanced Coma Free optics don´t have this aberration. You can see the difference with each look through the telescope: small round stars up to the edge of the field of view. The higher concentration of starlight also rises the contrast of the image and fainter stars get visible. If it is visual observing, or astrophotography: the Advanced Coma Free optics from Meade Instruments deliver the superior images when compared with conventional serial telescopes. Meade ACF telescopes provide a image quality that was in the past only available by Ritchey-Chretien telescopes and other exotic systems. Those telescope have prices that are much higher than the Meade ACF optics.

Tech Talk:

Why is Meade ACF optics better than conventional systems?



A telescope concentrates the starlight into a Airy disc, see upper images . The more light an airy disc contains, the brighter it appears. The airy disc is surrounded by diffraction rings, that are very faint in an ideal telescope. You can see the first and brightest ring in the upper images.

If we compare two telescopes with the same aperture, the telescope that concentrates more starlight into the airy disc will show brighter stars.

However, in conventional telescopes for amateur astronomers this ideal light concentration only happens on one point in the field of view: the middle. Outside the middle the stars get deformed because optical aberrations occur. The most disturbing of those aberrations is coma. When a optical system has coma, the starlight gets spread into a cometlike tail, see the image in the middle left. This not only happens at the very edge of the field: the image shows a star that is only 5mm from the middle of the field of view. If the distance to the middle gets larger, so does coma, see the picture below left. The starlight gets spread over a large area. For comparison see the images that a Meade Advanced Coma Free telescope provides: small round stars that are losing only very little contrast on the very edge of the field.

Professional observatories all over (and above) the world have used the tremendous advantages of coma free telescopes for decades. Nearly all research telescopes including the Hubble Space Telescope and the ESO Very Large Telescope are coma free designs. The extremely difficult manufacturing process made those so called Ritchey-Chretien-telescopes unavailable for most amateur astronomers due to the astronomic prices. Now you can get the outstanding performance of a Ritchey-Chretien telescope for a fraction of the cost. Meade Advanced Coma Free optics go even one step further: compared with typical Ritchey-Chretien telescope, the Meade Advanced Coma Free telescope doesn´t show diffraction spikes from secondary spider vanes and astigmatism, another optical aberration that appears in Ritchey-Chretien telescopes, is reduced.

Note: Changes and errors may have occured during the making of this pages. The star patterns were calculated on the basis of ray trace data for 8“ telescopes by using the free program Abberator. The copyright of the astrophoto belongs to Bernd Koch. Due to the limited dynamic range of computer monitors the images had to be processed..This happened with the same settings for all respective images.