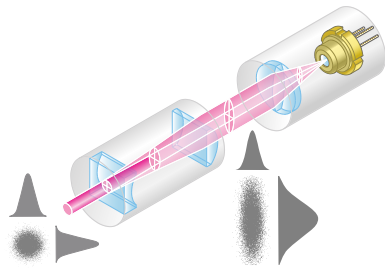
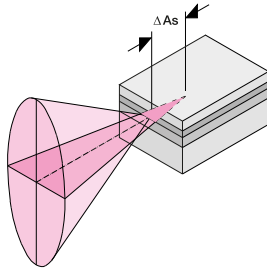
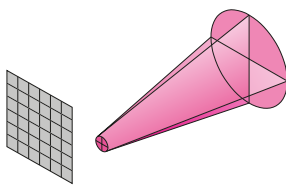


## HOW DO ANAMORPHIC OPTICS CORRECT ASTIGMATISM?

The optics type 5AN are cylinder lens systems and, therefore, can be additionally used to correct the astigmatic difference  $\Delta A_s$  of the laser diode or tapered amplifier through a refocusing of the optical system.



Optical scheme



Focus with plane wave fronts

### ASTIGMATISM OF LASER DIODES

Laser diodes have large aperture angles vertically (s) and smaller aperture angles in parallel (p) with the light-emitting layer. Additionally, some laser diodes have two virtual emission sources from the s- and p-directions, i.e. astigmatism, characterized by the axial displacement,  $\Delta A_s$ .

### OPTICAL BEAM PATH THROUGH AN ANAMORPHIC OPTICS

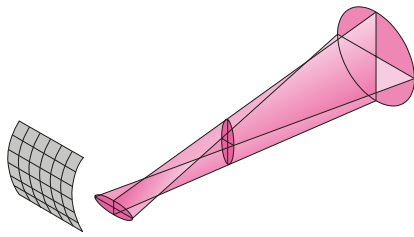
The collimating lens produces a collimated elliptical beam with a Gaussian intensity profile. If there additionally is an astigmatic difference,  $\Delta A_s$ , the beam is collimated in only one of the directions and is diverging in the other.

The anamorphic beam-shaping optics contains a positive and a negative cylinder lens, scaling down the longer - elliptical axis to that of the shorter axis. To compensate for divergence induced in the s-direction, the distance between the elements of the cylinder lens is increased (astigmatism correction).

The output beam profile of the anamorphic beam-shaping optics is circular and the beam is collimated (if the anamorphic form factor is chosen correctly). After astigmatism correction, the wave fronts are planar.

### WAVE FRONT OF AN ASTIGMATICALLY CORRECTED BEAM

When this beam is refocused, the spot is not only circular but also has plane wave fronts.



### WAVEFRONT WITHOUT ASTIGMATIC CORRECTION

Without astigmatism correction (e.g. when beam shaping is performed using anamorphic prism optics), the focus shows astigmatism and the wave fronts are curved.

*Focus with curved wave fronts*

This is a printout of the page

<https://sukhamburg.com/support/technotes/fiberoptics/coupling/anamorphic/astigmatismcorr.html> from 5/26/2026

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