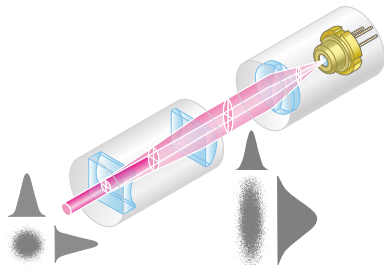
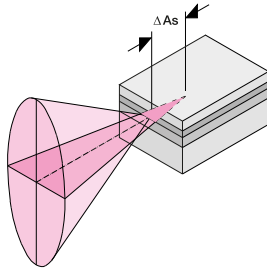
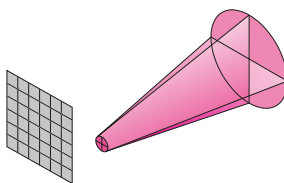


HOW DO ANAMORPHIC OPTICS CORRECT ASTIGMATISM?

The optics type 5AN are cylinder lens systems and, therefore, can be additionally used to correct the astigmatic difference ΔA_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, ΔA_s .

OPTICAL BEAM PATH THROUGH AN ANAMORPHIC OPTICS

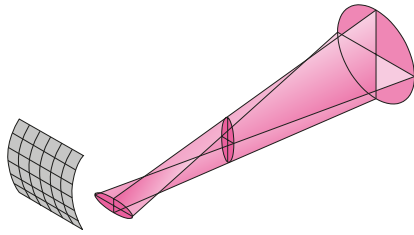
The collimating lens produces a collimated elliptical beam with a Gaussian intensity profile. If there additionally is an astigmatic difference, ΔA_s , the beam is collimated in only one of the directions and is diverging in the other.

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 5/23/2026

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