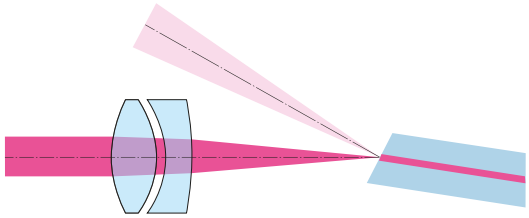
WHY USE A PREANGLED COUPLING AXIS?

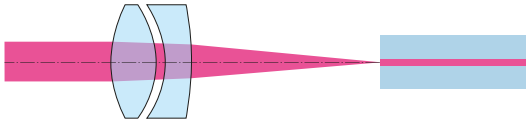
All Laser Beam Couplers and Fiber Collimators are supplied as type FC APC with a pre-angled coupling axis as standard.
The pre-angled axis has no diminishing effects on the coupling ratio and does not influence the collimated beam profile in any negative way. It only has advantages:

FIBER COUPLING: A PREANGLED COUPLING AXIS AND FC APC TYPE CONNECTORS AVOID BLACKREFLECTION



FIBER COUPLER WITH PREANGLED COUPLING AXIS

This shows the optical path of a fiber coupler with pre-angled coupling axis used with a fiber cable with type FC APC connectors (8°-polish).
Back-reflection into the laser system is suppressed and the laser spectrum does not change.
Inclined laser beam couplers / collimators ensure a coupling efficiency as high as those using a coaxial coupling axis with 0°-polish.

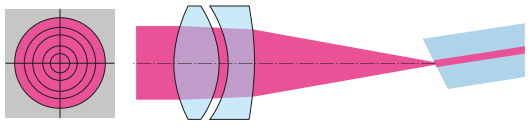


BACKREFLECTION: FIBER COUPLER WITH COAXIAL COUPLING AXIS

This shows the optical path of a fiber coupler with coaxial coupling axis used with a fiber cable with type FC PC connectors (0°-polish).
About 8% of radiation is reflected back into the laser system, which can cause multi-mode emission and optical noise.

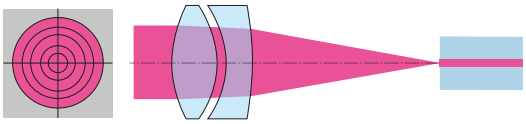
FIBER COLLIMATORS: A PREANGLED COUPLING AXIS DOES NOT CAUSE A DISTURBED BEAM PROFILE

The angled polish of connectors of type APC is considered by a pre-angled mechanical coupling axis that compensates the beam deflection and you can use the lens centrically. This minimizes aberrations simply resulting from a non-ideal beam path through the lens.



FIBER COLLIMATOR WITH PRE-ANGLED COUPLING AXIS

The angled polish of connectors of type APC is considered by a pre-angled mechanical coupling axis that compensates the beam deflection and you can use the lens centrically. This minimizes aberrations simply resulting from a non-ideal beam path through the lens.
The collimated beam is centered, Gaussian and concentrically symmetric.

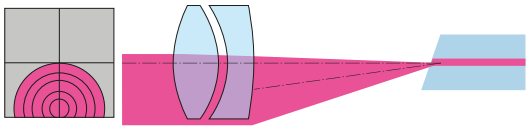


FIBER COLLIMATOR WITH COAXIAL COUPLING AXIS

The collimated beam is centered, Gaussian and concentrically symmetric.

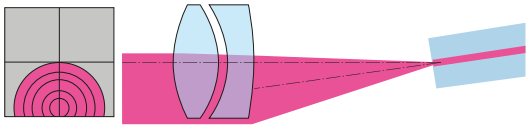
COMBINATION MISMATCH: WHAT HAPPENS WHEN FC PC AND FC APC TYPE COMPONENTS ARE MIXED?

When a combination mismatch occurs, either between an 8°-polish fiber inappropriately attached to a coaxially coupled fiber collimator or vice versa, a 0°-polish fiber connected to an inclined coupled fiber collimator, then the resultant beam is axially displaced, asymmetric and differs significantly from a Gaussian profile.



MISMATCH: DISTURBED BEAM PROFILE

Optical path of a fiber cable with FC APC type connectors with a FC PC type collimator.



MISMATCH: DISTURBED BEAM PROFILE

Optical path of a fiber Cable with FC PC type connector used with a FC APC type collimator.

This is a printout of the page
https://sukhamburg.com/support/technotes/fiberoptics/coupling/couplingbasics/preangled.html from 5/10/2025

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