DIEMOUNT SOLUTIONS

Grinded polymer fiber couplers

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Overview

1. Basic splitter unit

2. Standard splitter modules

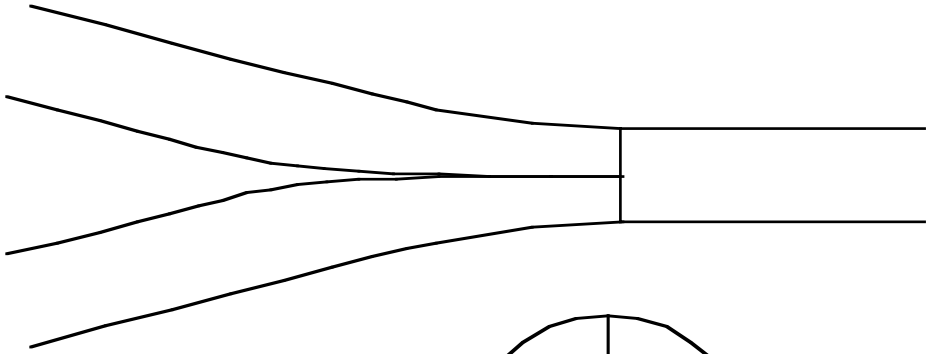
- Fabrication of 50:50 standard splitters
- Asymmetrical splitters
- More complex splitter devices

3. Splitter modules with low near end cross talk

- Fabrication of loss cross talk splitters
- Application I: Bidirectional datacom systems
- Application II: Fiber sensor systems

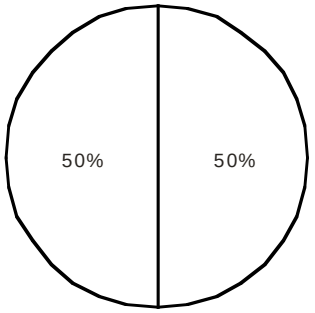
Functional principle

output POF 1



input POF

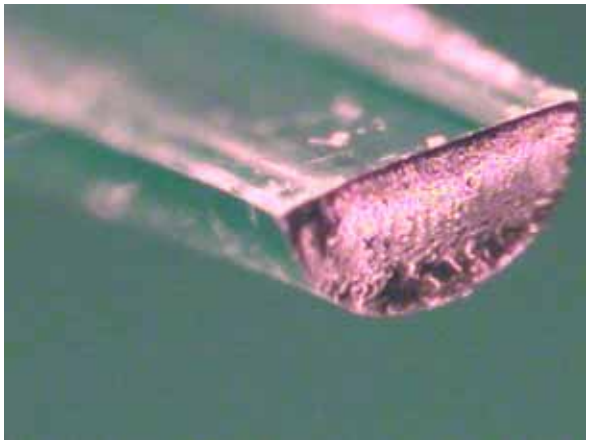
output POF 2



cross section

Basic splitter unit

1mm POF (1.25 cable)
polished to half diameter



cross section polishied area

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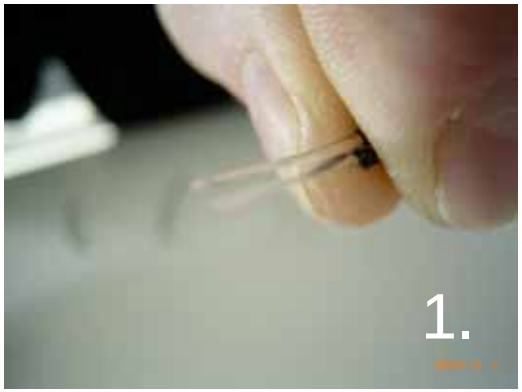
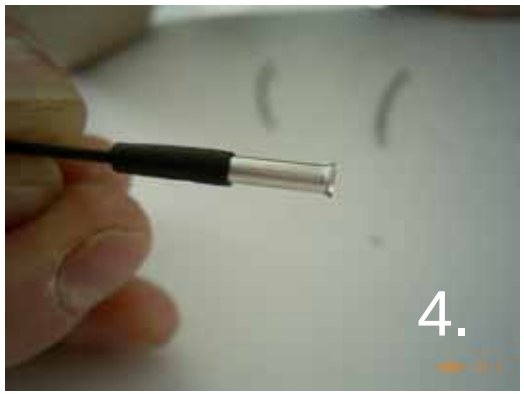
Assembly of 50:50 splitter modules



2 half circle cross section fibers

insertion to 2.2 mm POF cable

endface precision cut



assembly with wire end ferrule

splitter module

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Technical figures 50:50 splitters

type	***splitting ratio***	***excess loss***	***cross talk*** *(without output fiber)*
precision cut splitter	better than 65:35 (35:65)	1 to 2.5 dB	typ. figure: 18 – 22 dB
wet polished splitter	better than 65:35 (35:65)	typ. figure: 0.6 to 1.0 dB	typ. figure: 13 – 15 dB

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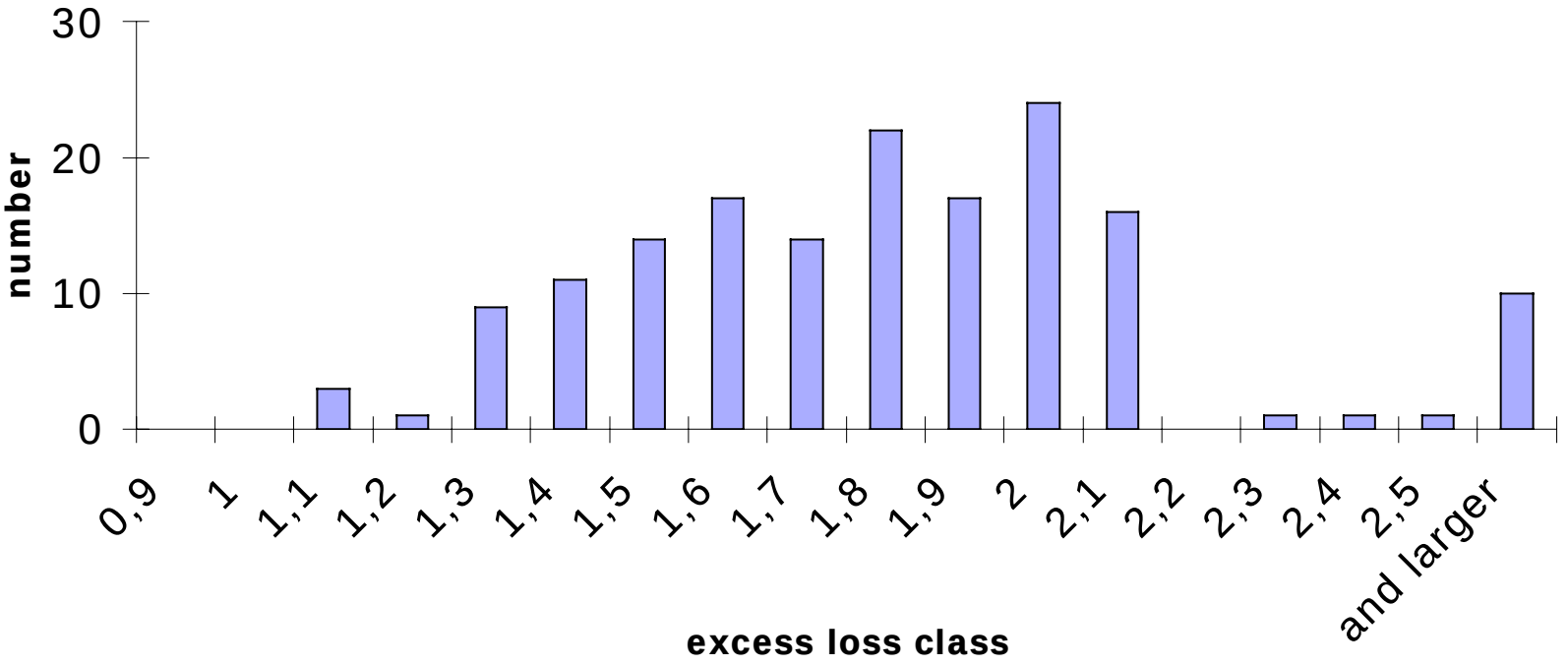
Excess loss distribution precision cut 50:50 splitters



sample number: 161

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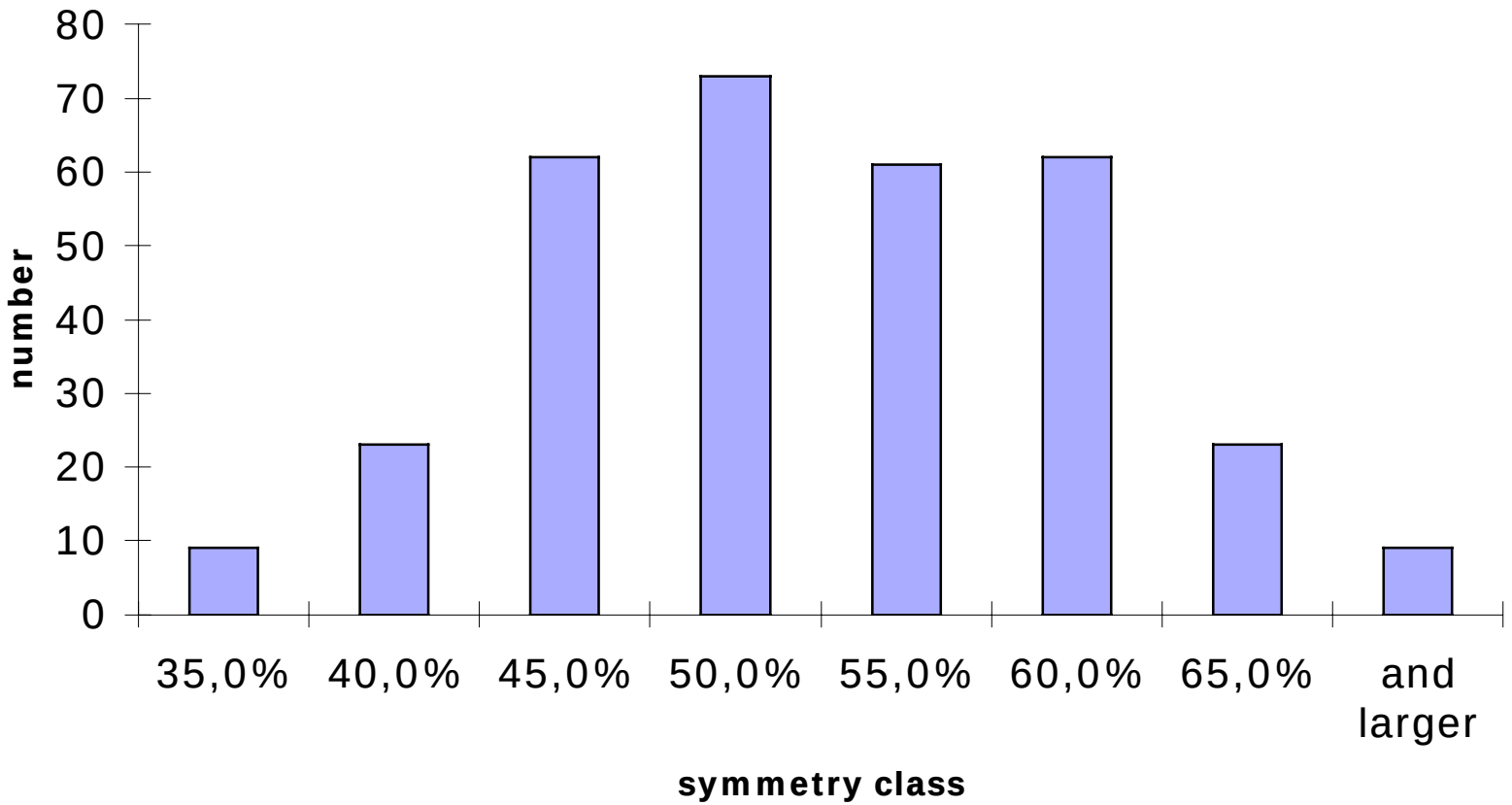
Symmetry distribution precision cut 50:50 splitters



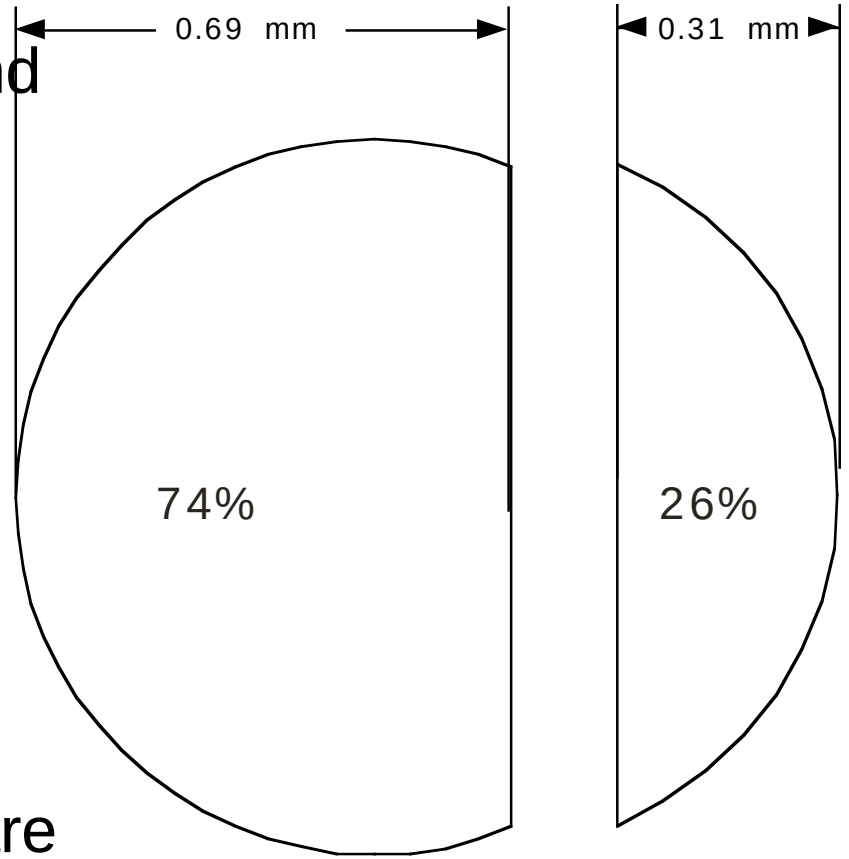
Splitter symmetry better than 65:35 (35:65)

Asymmetrical splitter

- 310µm thin POF branches and
- 690µm thick POF branches

result in

asymmetrical splitters of 25:75 splitting ratio



More asymmetrical splitters are difficult due to the practical assembly of the thin POF branch.

Asymmetrical splitters: technical figues and application

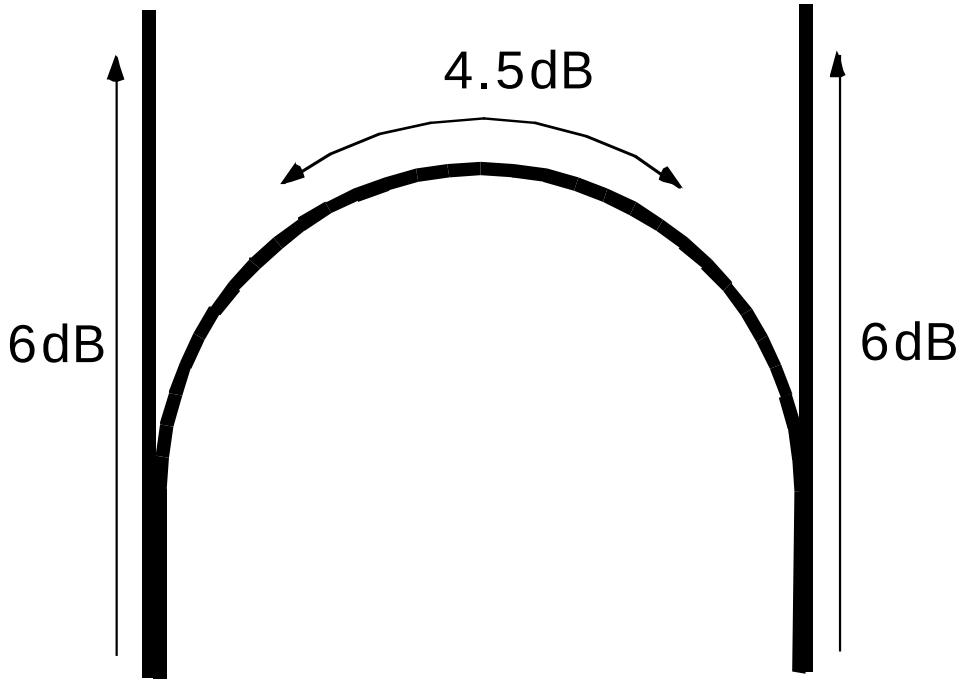
type	***splitting ratio***	***excess loss***
25:75 asymmetrical wet polished splitter	typ. figure: 65:35 to 80:20	typ. figure: 1 to 2 dB

Applications:

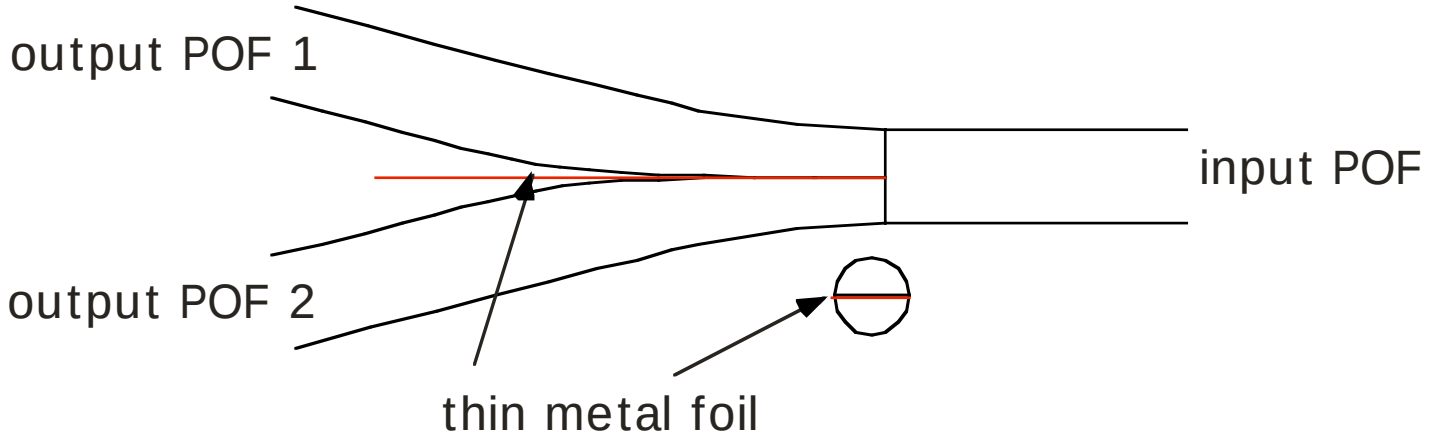
- transmitter optical power control
- bidirectional test setup

More complex splitter devices

e.g. **bidirectional system test splitter module** (wet polished endfaces):



Low cross talk splitters



- A thin metal foil (or evaporated metal film) between the output branches increases cross talk attenuation by about 5dB.
- The input POF endface should be carefully prepared. An index matching medium is very useful for low cross talk requirements.

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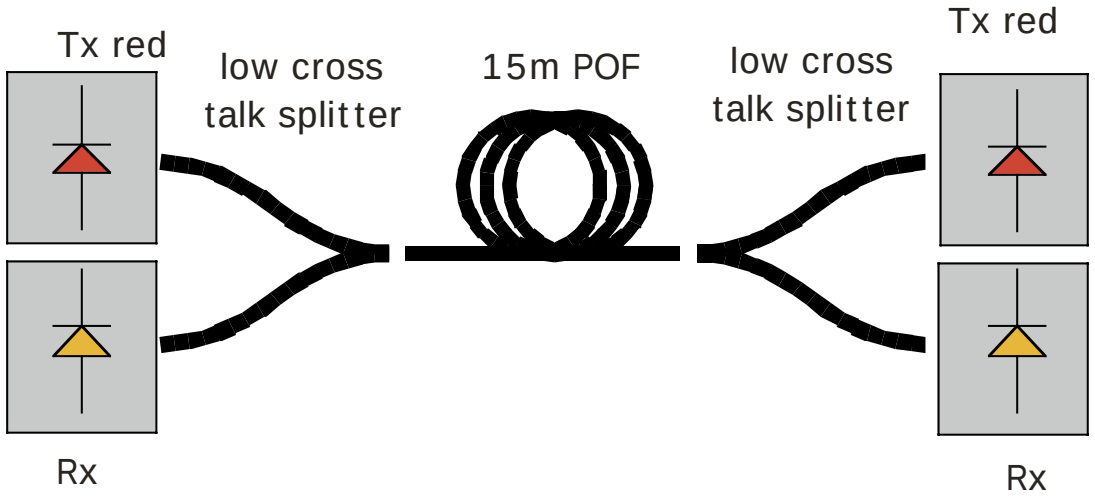
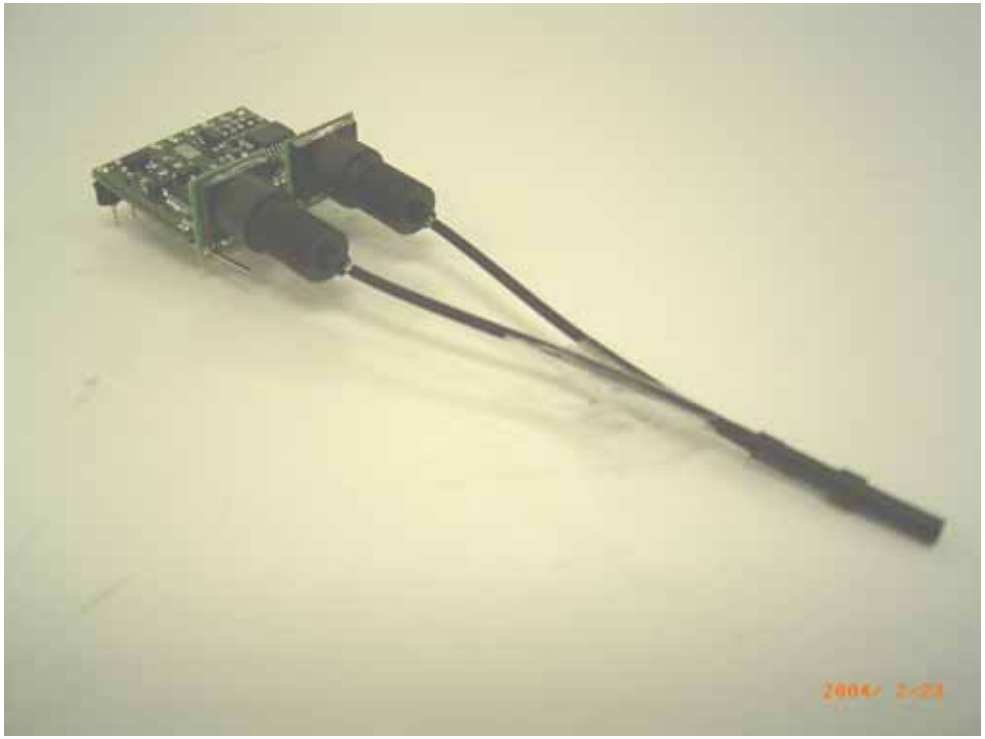
Application I: Low cross talk splitter in simplex systems



One wavelength simplex systems suffer from a missing near end cross talk (NEXT) suppression.

Low cross talk splitters reduce NEXT.

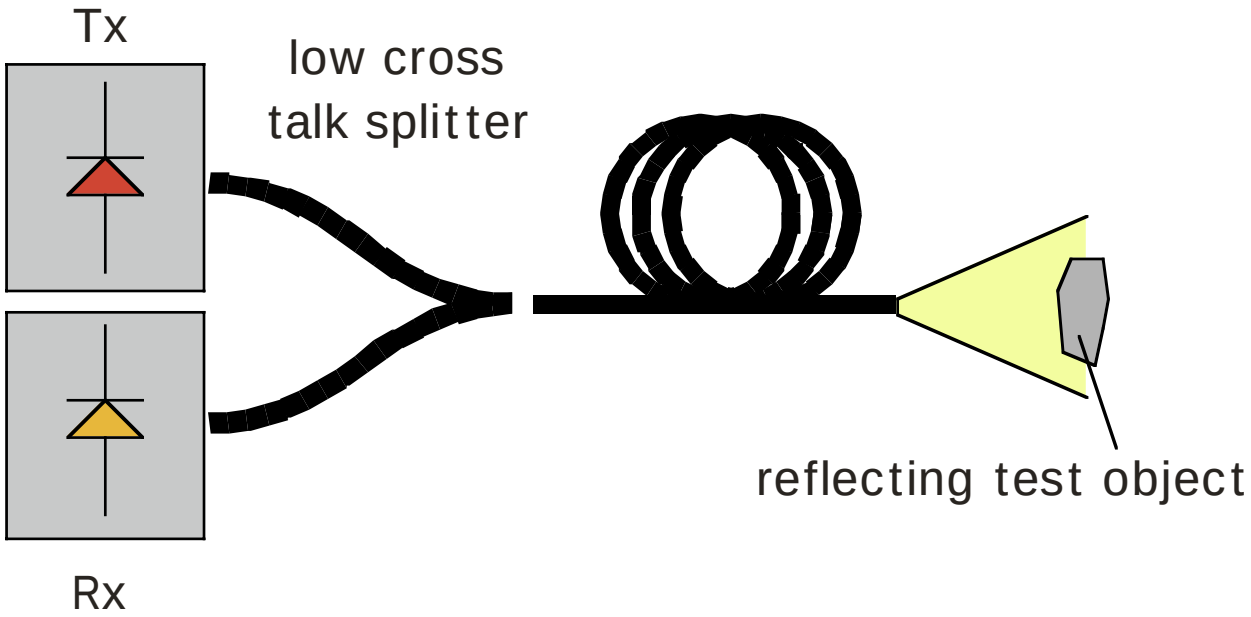
15m fast ethernet transmission was successfully tested by one wavelength simplex transmission.



Near end cross talk (NEXT) suppression:

- Low cross talk splitters (645nm both directions): up to 15m
- WDM -system (2 different wavelengths and λ-filters): 50m

Application II: Low cross talk splitter in simplex fiber sensors



Low cross talk splitters increase sensor sensitivity of simplex fiber sensor systems.