

A DISPERSION MEASURING SETUP

Educational time-domain fiber dispersion measurement system

Dispersion is one of the fundamental effects of the light-material interactions. The spectral decomposition of sun light in prisms, as well as the dynamics of ultra-short pulsed lasers (i.e. the change of the spectral pulse properties like chirping) are based on this effect.

Due to the strong material influences to the spectral properties of transmitted light, the exact determination of the material dependent dispersion parameters are important. The time-domain fiber dispersion measurement system is an open measurement setup to analyze the dispersion behavior of different types of fibers. Standard single mode fibers as well as rare-earth doped fibers can be characterized. The obtained dispersive properties are essential for current state-of-the-art fiber laser systems and their applications; For example, the creation of ultra-short pulses in a fiber-based femtosecond laser or the generation of supercontinuum white light in photonic crystal fibers.

The measurement system is an easy-to-use time-of-flight setup. With exchangeable band-pass filters, specific spectral components of the extremely broadband supercontinuum source (SC) can be selected. Therefore, the wavelength dependent dispersion parameters can be measured. The incoming beam is divided up into a reference and a measuring beam. The reference signal is directly detected and the measuring beam is coupled into the fiber. The temporal difference of the measurement signal to the reference signal is used to calculate the dispersive parameters of the fiber.

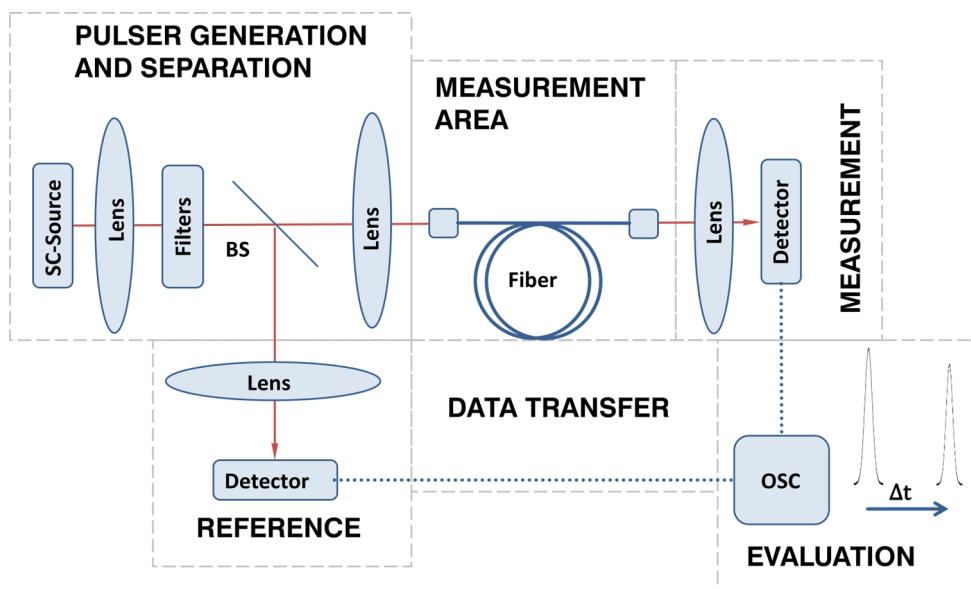


Fig. 4: Schematic of the time-domain fiber dispersion measurement system.