

Three-channel fiber optic spectrometer



Article Overview

A three-channel fiber optic spectrometer simultaneously collects light from three separate optical fibers, disperses it via a diffraction grating, and detects the spectra on a multi-element array detector for rapid, high-resolution spectral analysis.

Basic Working Principle

A fiber optic spectrometer operates by guiding light from a sample to the spectrometer using optical fibers, which decouple the measurement point from the instrument and allow flexible sampling in confined or hazardous environments . In a three-channel configuration, three separate fibers deliver light from different sources or locations into the spectrometer simultaneously. The light from each fiber passes through an entrance slit, which defines the spectrometer's resolution and étendue. A collimating lens converts the divergent light from the fiber into a quasi-parallel beam, which then strikes a diffraction grating. The grating disperses the light into its constituent wavelengths, spreading each channel's spectrum spatially .

Multi-Channel Detection

After dispersion, an imaging mirror or lens system focuses the spectra onto a solid-state array detector (such as a CCD or CMOS array). Each fiber's spectrum is projected onto a distinct region of the detector, allowing simultaneous acquisition of three spectra without moving parts. The detector converts the optical signals into electronic signals, which are then digitized and processed by the spectrometer's data acquisition system

Article Content

Jul 27, 2026

Lab-in-fibers: Single optical fiber with three channels for ...

In this paper, we reported a three-channel sensor based on double hole optical fiber (DHOFF) with the simultaneous

Jan 29, 2026

Multi-channel-Spectrometer | CNIlaser

Multi-channel-Spectrometer,CNI provides fiber optic spectrometer, raman spectrometer,fluorescence spectrometer,LIBS,

Jan 31, 2026

An Introduction to a Spectrometer: Fiber Optic Bundles

Explore the use of fiber optic bundles in spectrometers for simultaneous sampling and enhanced signal-to-noise ratio

Jun 20, 2026

Optical fiber-based open source low cost portable spectrometer

This article explores the development of a small, compact fiber-based spectrometer system designed to overcome the

Jun 16, 2026

Research on Three-Channel Detection Based on M-Shaped SPR Fiber-Optic ...

Research on Three-Channel Detection Based on M-Shaped SPR Fiber-Optic Sensor
Abstract: This study presents a novel surface

Jun 26, 2026

DSP and FPGA-based multichannel fiber-optic spectrometer

By using eight linear array charge coupled devices as the photo detector, a new type of multichannel fiber-optic

Feb 26, 2026

(PDF) Multimode optical fiber based spectrometers

A standard multimode optical fiber can be used as a general purpose spectrometer after calibrating the wavelength

May 24, 2026

A triple-channel optical fiber SPR sensor with high performance and

In this paper, we propose for the first time a triple-channel optical fiber surface plasmon resonance (SPR) refractive

Aug 30, 2025

Spectrometer,Uv Fluorescence Spectrometer,High

Fluorescence Spectrometer has the features of high sensitivity, strong selectivity, micro samples and

Sep 10, 2025

AvaSpec Multichannel Fiber Optic Spectrometers

AvaSpec -USB1.1 platform The AvaSpec USB1.1 platform Fiber Optic Spectrometers can be configured as single, dual, triple,

Feb 24, 2026

Optical spectrometer / laboratory / PMT

Optical Spectrometers Fiber Optic Spectrometers Optical spectrometer / laboratory / PMT Optical spectrometer / laboratory / PMT

Jul 27, 2026

A Fiber-Optic Array Spectrometer with Parallel Multichannel Optical ...

Abstract— This paper describes a new optical spectroscopy instrument achieving lock-in detection in all its spectral output channels

Sep 01, 2025

Multi-Channel Fiber Optic Spectrometers: AvaSpec

AvaSpec Multi-channel Fiber Optic Spectrometers -USB1.1 platform The AvaSpec USB1.1 platform Multi-channel

Jan 07, 2026

Multi-channel-Spectrometer | CNIlaser

CNI developed Rainbow series Multi-channel spectrometer with the features of wide spectral range and high resolution. With

Jun 19, 2026

AvaSpec Dual-Channel Fiber-optic Spectrometer

Sometimes a single channel spectrometer is not enough, for example when you want higher resolution or to do two redundant

Apr 17, 2026

Spectroscopy Solutions | Avantes | Scientific Instruments

Your Partner In Spectroscopy Avantes is the leading innovator in developing fiber-optic spectroscopy instruments and

Feb 18, 2026

Compact and high-resolution spectrometer via Brillouin integrated ...

This work presents a compact spectrometer using acoustic Brillouin scattering on a hybrid chip, achieving a 0.56 nm

Dec 26, 2025

Microsoft Word

Recently, we showed that a multimode optical fiber can also function as a spectrometer by measuring the wavelength-dependent

Nov 09, 2025

Multi-channel fiber optical spectrometer for high-throughput ...

The multi-channel fiber optical spectrometer synergistically combines a sample library holder, multiple modular

Apr 18, 2026

Multi Channel Spectrometer | SIMTRUM Photonics Store

With optional channels, this spectrometer features high resolution, high sensitivity . What's more, it is very

Nov 19, 2025

Spectrometers | UV VIS NIR | Avantes

The kind of spectrometer depends on the needed measurement technique for your application. Avantes specializes in high-end fiber

Feb 22, 2026

Spectrometer Basics

The digitized signal is then transmitted to a computer and processed through specialized algorithms which enables it to be plotted as

Aug 29, 2025

Multi-Channel Fiber Optical Spectrometer

Multi-Channel Fiber Optical Spectrometer This S series multi-channel fiber optical spectrometer with Hamamatsu detector is

Nov 25, 2025

Fiber optic spectrometer

Find your fiber optic spectrometer easily amongst the 28 products from the leading brands (ABB, SARRALLE, Bourn And Koch, ...)

Dec 05, 2025

Fiber Optic Spectroscopy

Fiber Optic Spectroscopy The combination of Linear Array Detector and Spectrometer has become the system of choice for

Dec 16, 2025

Multi-mode optical fiber

Multi-mode fiber is used for transporting light signals to and from miniature fiber optic spectroscopy equipment (spectrometers,

Apr 15, 2026

Multiple Channels | Anglia Instruments | Spectrometers & Fibre Optics

AvaSpec-Multi Multi Channel Fibre Optic Spectrometers If you requires higher resolution measurements over a broad range, or

Oct 27, 2025

Fiber Optic Spectrometer

CNI developed spectrometers with the characteristics of compact and portable design, plug and play, easy operation and Spectral

Contact Us

For more information, pricing, or custom solutions, please contact us:

Website: <https://www.greatpremiersolutions.co.za>

Email: sales@greatpremiersolutions.co.za

Phone: +27 82 914 3675

Address: Unit 5, Silicon Heights, 22 Electron Avenue, Cape Town, 8001, South Africa

This document is for informational purposes only. Specifications subject to change without notice.

