

Long-distance Spectrometer



AI Overview

Long-distance spectrometers are instruments designed to perform optical or chemical analysis of samples from meters away, enabling remote, non-contact measurements in research, industrial, or hazardous environments. Overview A long-distance spectrometer is a type of optical or chemical analyzer that allows measurements without direct contact with the sample. These instruments can operate over distances ranging from a few centimeters to tens or even hundreds of meters, depending on the technology used. They are particularly useful for analyzing large, inaccessible, or hazardous samples where traditional contact-based spectrometry is impractical.

.Types and Technologies1. Raman Spectrometers: Remote Raman spectrometers use laser excitation and fiber-optic probes to collect scattered light from a sample at a distance. They can provide high-quality spectra for materials such as plastics, coatings, or bulk solids, even through transparent barriers or reflective surfaces. Flexible sampling arms and transmission Raman accessories allow precise targeting and motion control for large or delicate samples . 2. Laser-Induced Breakdown Spectroscopy (LIBS): Mobile LIBS spectrometers, like the X-Trace, use a high-power pulsed laser to generate plasma on the sample surface. The emitted light is analyzed to determine elemental composition. These devices can perform remote analysis over distances exceeding 20 meters, making them suitable for fieldwork, hazardous environments, or in-situ industrial applications . 3. Chromatic Confocal Sensors: While primarily used for precise distance and surface profiling, chromatic confocal sensors can be coupled with spectrometers to measure spectral shifts over extended working distances. They exploit chromatic dispersion to determine sample displacement and surface topography with high axial and lateral resolution, typically up to several hundred millimeters .ApplicationsIndustrial Quality Control: Non-contact measurement of surface composition, coatings, or bulk materials.Environmental an...

Article Content

Scalable on-chip diffractive speckle spectrometer with high spectral ...

The proposed speckle spectrometer based on diffractive metasurfaces achieves a high spectral density which is promising to develop ultra-compact and high-performance spectrometers.

Long Distance Continuous Methane Emissions Monitoring with Dual ...

We measure long (> 500 m), integrated open-path concentrations of atmospheric methane using a dual frequency comb spectrometer and combine measurements with an

Southwest Spectro SuperLR Probe Long-Working-Distance Confocal

The Southwest Spectro SuperLR Probe is an engineered long-working-distance confocal Raman spectrometer designed for in situ and operando spectroscopic analysis under demanding industrial

Denoising-autoencoder-facilitated MEMS computational spectrometer

The Internet-of-Things era desiderates miniature spectrometers. Here, the authors present a chip-scale spectrometer through synergizing MEMS modulation and autoencoder

Spectrometers, Spectrographs and Monochromators

We make instruments from short focal length, high-throughput spectrographs to long focal length, high-resolution monochromators, with a variety of choices for many different applications.

Hydrogen-Deuterium Exchange Mass Spectrometry Identifies Local and Long ...

Hydrogen-Deuterium Exchange Mass Spectrometry Identifies Local and Long-Distance Interactions within the Multicomponent Radical SAM Enzyme, PqqE

Ultra-long-working-distance spectroscopy of single ...

Tiny elliptical microlenses efficiently focus light onto and extract it from nano-sized light emitters, enabling an ultra-long-working-distance measurements.

Spectral Resolution in Raman Spectroscopy

Spectrometer Focal Length The distance between the focusing mirror and the detector is termed the spectrometer focal length. The longer the spectrometer focal length the better the spectral

Dual-comb photothermal spectroscopy | Nature Communications

"Recent developments in spectroscopy have witnessed the establishment of dual-comb techniques. In this work the authors demonstrate dual-comb photothermal spectroscopy providing

Advances in cost-effective integrated spectrometers

This review paper shows the market trend for chip-scale spectrometers and analyzes the key metrics that are required to adopt miniaturized spectrometers in real-life applications.

Night Vision Boosts Affordable Raman System for Long-Range

Researchers in Thailand have developed a cost-effective standoff Raman spectroscopy system using a night-vision intensified spectrometer and digital correction algorithms. The system

Cross dual-microcomb dispersion interferometry ranging

High-accuracy and long-range absolute distance measurement plays a crucial role in various fields, including aerospace, industrial production, daily life, and scientific research (1). The

Optical design of Fery imaging spectrometer with large working distance ...

An ultra-compact concentric catadioptric imaging spectrometer with large relative aperture and long slit is proposed. It consists of three optical components integrated monolithically in a ...

Long-distance remote laser-induced breakdown spectroscopy using ...

We demonstrate remote elemental analysis at distances up to 90 m, using a laser-induced breakdown spectroscopy scheme based on filamentation induced by the nonlinear propagation of

Design and Simulation of a Compact Remote Raman-LIBS

This study provides a theoretical foundation for achieving stable in-orbit detection in lunar material exploration and other long-distance signal detection missions.

Spectrometers

Spectrometers for Extreme Spectral Regions Traditional spectrometers work in the visible spectral range and/or with near- infrared, or possibly with near- ultraviolet

Long-term continuous monitoring of methane emissions at an oil

Article Open access Published: 05 January 2024 Long-term continuous monitoring of methane emissions at an oil and gas facility using a multi-open-path laser dispersion spectrometer

Optical design of Fery imaging spectrometer with large working

This article demonstrates a imaging spectrometer using Fery prism with large working distance and long slit length. Two spherical lenses are inserted between the double-convex lens and

TOF mass spectrometer

The longer the flight tube, the more time the ions have to separate based on their mass, leading to better resolution in the final mass spectrum. The accelerating ions now enter a portion of the mass

Spectrometers

Fourier-transform spectrometers can contain a Michelson interferometer, where one arm length can be mechanically scanned over a long distance (millimeters,

A long working distance optical microscope for ...

Thanks to the large working distance, various external field manipulation devices (such as high pressure, low temperature, stress, etc.) and in-situ/operando reaction cells can be incorporated

Cobra-S 800 OCT Spectrometers

Models for long-range, high resolution imaging Our newest line of 800 nm OCT spectrometers, the Cobra-D, uses a proprietary optical design to provide up to 12

Compact Spectral Imaging: A Review of Miniaturized

1 Introduction Spectral imaging systems are advanced optical platforms that synergize conventional imaging and spectroscopy to enable spatially resolved

Long-Range and Dead-Zone-Free Dual-Comb Ranging for the

Dual-comb ranging has emerged as an effective technology for long-distance metrology, providing absolute distance measurements with high speed, precision, and accuracy. Here, we

Long-Range and Dead-Zone-Free Dual-Comb Ranging for the

Here, we demonstrate a dual-comb ranging method that utilizes a free-space transceiver unit, enabling dead-zone-free measurements and simultaneous ranging with interchanged comb

Design and Series Product Development of a Space-Based Dyson

The design concept and fabrication methods, as well as the results of imaging evaluations of the proposed spectrometer, are described in detail. At present, the advanced Dyson

Contact Us

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

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

Email: info@estlascleaning.co.za

Phone: +27 63 214 8579

Address: 22 Oxford Road, Parktown, Johannesburg, 2193, South Africa

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

