

Computational Reconstruction Spectrometer





Computational Reconstruction Spectrometer

CMOS-compatible reconstructive spectrometers with

We introduce a unique approach that combines the advantages of conventional and computational spectrometers to achieve robust and accurate spectral

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A computational spectrometer for the visible, near, and

Junren Wen, Weiming Shi and colleagues propose a computational spectrometer spanning visible to mid-infrared by integrating a Single-Spinning

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A Low-Cost Computational Spectrometer Based on a

Computational spectrometers based on coded measurement and computational reconstruction have great application prospects. This paper

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Reconstructive spectrometers: hardware miniaturization and

This review synthesizes interdisciplinary progress in reconstructive miniaturized spectrometers, encompassing mathematical frameworks, hardware innovations, and end-to-end

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Reconstructive spectrometers: hardware miniaturization

Reconstructive spectrometers are based on a synergistic fusion of miniaturized encoding hardware and computational reconstruction algorithms.

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Review of Miniaturized Computational Spectrometers

Spectrometers are key instruments in diverse fields, notably in medical and biosensing applications. Recent advancements in nanophotonics

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Silicon Photonic Spectrometer Hits Picometer Resolution

Reference: "Miniaturized computational dispersion-engineered silicon photonic vernier caliper spectrometer" by Hao Deng, Tong Lin, et al., 26 March 2026, Photonix. /Public Release. This

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MEMS-Enabled Computational Spectrometer Using A Denoising



On-chip spectrometers using silicon photonics offer a practical and economical solution for wearable electronics and portable instruments. However, noise affect.

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[2201.06149] Reconstruction-based spectroscopy using CMOS image

Recently, reconstruction-based spectrometers have gained popularity for their compact size, easy maneuverability, and versatile utilities. These devices exploit the superior computational

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A survey on computational spectral reconstruction methods from RGB

As the hyperspectral reconstruction from RGB images opens up more and more promising applications, a thorough review becomes a necessity to inspire future research. In this work, we take a

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Reconstructive spectrometers: hardware miniaturization and

This review synthesizes interdisciplinary progress in reconstructive miniaturized spectrometers, encompassing mathematical frameworks, hardware innovations, and end-to-end design strategies

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Fast spectrum reconstruction based-on interpretable network with

Computational spectrometers has a great potential for real-time detection in site measurements. Reconstruction algorithms play a pivotal role. Traditional reconstruction algorithms,

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Computational spectrometers enabled by nanophotonics



The major components and common operation mechanisms of computational spectrometers. Transmitted, reflected, or absorbed spectra are filtered by multiple

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Miniaturized chaos-assisted Spectrometer , Light:

In this work, we present a novel chaos-assisted computational spectrometer that capitalizes on intrinsic chaotic behavior.

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Reconstructive Spectrometers: Hardware Miniaturization

The emergence of reconstructive spectrometers represents a transformative leap in spectral analysis, combining miniaturized encoding

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Zhang, Yiru; Yang, Enbo; Yoon, Hoon Hahn; Cheng, Qixiang; Sun,

In recent years, researchers have developed various photonic structures with sophisticated spectral modulation to explore encoding schemes for reconstructive spectrometers. Based on different

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Nonlinear memristive computational spectrometer

Miniature computational spectrometers leveraging 2D materials utilize advanced algorithms to enhance spectral resolution and reconstruction accuracy without degrading device

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On-Chip Reconstructive Spectrometer Based on Parallel



In this paper, we have developed an on-chip spectrometer with a programmable silicon photonic filter by simply using parallel cascaded micro-ring

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Denoising-autoencoder-facilitated MEMS computational

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

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Advances in Miniaturized Computational Spectrometers

They have attracted widespread attention and a variety of materials, optical structures, and photodetectors are adopted to fabricate computational

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Small and simple: next-generation miniaturized diffraction-based

News & Views Open access Published: 07 May 2024 Small and simple: next-generation miniaturized diffraction-based spectrometer with computational reconstruction algorithms Markus

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Reconstructing computational spectra using deep learning's self

Miniaturized computational spectrometers have become a new research hotspot due to their port-ability and miniaturization. However, there are several issues, like low precision and poor stability. Because

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In situ spectral reconstruction based on a memristor chip for energy



Here we report an in situ computational spectrometer implemented on a fully integrated 576-Kb memristor chip.

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Advances in Miniaturized Computational Spectrometers

This review presents a comprehensive overview of miniaturized computational spectrometers, focusing on spectral encoding strategies and reconstruction

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Innovative Inverse-Design Approach for On-Chip Computational

However, the current computational spectrometers are impractical because they rely on a brute-force random design approach for disordered structures. This leads to an uncontrollable, non

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Ultra-simplified diffraction-based computational spectrometer

We propose an ultra-simplified computational spectrometer that employs a one-to-broadband diffraction decomposition strategy facilitated by a numerical regularized transform that

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Reconstruction-based spectroscopy using CMOS image sensors with

Recently, reconstruction-based spectrometers have gained popularity for their compact size, easy maneuverability, and versatile utilities. These devices exploit the superior computational capabilities

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Reconstructive spectrometers: hardware miniaturization and



Abstract Spectrometers serve as indispensable analytical tools across chemistry, materials science, environmental monitoring, medical diagnostics, and beyond. The emergence of reconstructive

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Computational spectral reconstruction using a Quasi-random

In this work, we present a highly compact metasurface-based infrared spectrometer that leverages deep learning for spectral reconstruction. The system employs 24 distinct Quasi-Random

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