

# Wide-field Spectrometer



## Overview

••This optical system is a new type of integrated field of view imaging spectrometer. ••••This optical system is a new type of integrated field of view imaging spectrometer. ••The structure can simultaneously obtain high resolution with a wide field of view. ••This new structure has the characteristics of simple structure, easy debugging. The currently available area array imaging spectrometer fails to provide high spectral resolution and fast imaging under a wide field of view (FOV). Therefore, this study proposes an integral field imaging spectrometer (IFIS) that uses an image-space telecentric lens (ISTL), a mask, and lenslet array (MLA) as the front structure of the system. The influence of their structural parameters on the optical performance of the system is analyzed by establishing ISTL and MLA models. We selected suitable structural parameters to establish the imaging spectrometer, and provided an experimental demonstration of the system. Our system can achieve a 1.6 nm spectral resolution in a wide FOV of 48.8°. Compared with other spectrometer designs, our system is characterized by a simple structure, wider FOV, and higher spectra. Imaging spectrometer Image-space telecentric lens Lenslet array Integral field An imaging spectrometer

provides both spatial and spectral information simultaneously to facilitate the analysis of the target scene. Therefore, imaging spectrometers have been widely used in defense, aerospace, remote sensing, public safety, and various other fields,,. Studies in spectrum acquisition have been conducted for decades, the scanning method used by the earlier spectrometers can only acquire a single beam of light at a time, which limits the sampling rate. Later works focused on developing both efficient image capturing capability and high spectral and spatial resolutions. Although the design of some spectrometers with new structures has improved the spectral resolution, field of view (FOV), and spatial resolution to some extent, these three parameters still need further improvement. A schematic of the system is shown in Fig. 1. The system consists of an ISTL, MLA, dispersion system, and imaging system. The core of the system is a combination of ISTL and MLA. The ISTL makes the chief ray of each object point, in different FOV, parallel. Therefore, the incident light in different FOV has a similar geometric light path for entering the subsequent system. The parallelism of the chief rays emitted from the ISTL will largely affect the spectral resolution. Each object point corresponds to an image point on the focal plane of the ISTL. At this time, a mask is placed on the image focal plane near to the down-sample object surface. A certain number of sub-apertures are distributed on the mask. These number of sub-apertures determine the spatial resolution. Through discretized sampling of the object surface, mutual cr.

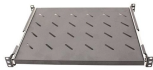
## Wide-field Spectrometer



The WFIS is a patented optical design intended for use in remote sensing of the Earth and the Earth's atmosphere in the hyperspectral imaging mode. It is meant to operate as a pushbroom ...



A wide-field imaging spectrometer based on a grating prism is proposed. The grating and prism parameters are discussed to balance spectral distortion over the entire band.



The spectrometer is intended to be launched on a small satellite orbiting at 700 km and observing the Earth with a wide field-of-view of  $120^\circ$  and a spatial resolution of 2.6 km at nadir. The satellite will ...



WFOS will provide highly efficient imaging and multi-slit spectroscopy over the wavelength range  $0.31\text{-}1.0\ \mu\text{m}$  and a wide field of view of  $8.3 \times 3$  arcminute, centered at the telescope optical axis.



By enabling simultaneous CD and ORD measurements over wide fields of view, it provides a unique imaging approach that captures chiral variations within heterogeneous samples.



The WFIRST payload includes two main instruments: a wide field instrument and a coronagraph instrument. The wide field instrument provides the wide-field imaging and slitless spectroscopy ...



To address the limited field of view (FOV) of traditional spectrometers, this paper proposes an improved wide-FOV infrared slitless spectrometer system ...



In this paper, the design specifications and performance statistics of a compact, high-resolution, and wide FOV spectrometer is presented, in which ISTL and MLA were employed to ...



To address the limited field of view (FOV) of traditional spectrometers, this paper proposes an improved wide-FOV infrared slitless spectrometer system based on the Dyson ...



The Wide Field-of-view Imaging Spectrometer (WFIS), a high-performance pushbroom hyperspectral imager designed for atmospheric chemistry and aerosols measurement from an aircraft or satellite, ...



WFSS mode disperses the light of any object that is within the field of view of the instrument. This often results in hundreds, if not thousands of spectra that often overlap in the final observation. This mode ...

## Contact Us

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

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

Email: [sales@samastersbaseball.co.za](mailto:sales@samastersbaseball.co.za)

Phone: +27 63 874 2095

Address: 15 Innovation Drive, Technopark, Stellenbosch, 7600, South Africa

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

