nova II™ Spectrophotometer [UV-Vis model]

Applied Analytics DS-201A — Revised 17 June 2013

The heart of an Applied Analytics system.

The nova-II Spectrophotometer is a core component of several Applied Analytics products. This device performs absorbance spectroscopy by transmitting a light signal across the path of a sample fluid via fiber optic cables.

The major sub-components of the nova II include:

(A) The light source. The ultraviolet-visible (UV-Vis) model nova II uses a pulsed xenon lamp.

(B) The slit. This refers to the narrow aperture in the plate located at the focus of the spectrophotometer lens. It is exactly the size of one photodiode in the array, thus ensuring that each wavelength band is projected only onto the corresponding photodiode.

(C) The holographic grating. Physical separation (dispersion) of the received light signal and spectral imaging onto the diode array are both accomplished by the concave holographic grating. The angle in which the light is dispersed is proportional to the wavelength, such that each wavelength is differentiated and imaged onto a different point in the diode array.

(D) The photodiode array. The linear array contains 1,024 light-sensitive elements, each measuring an assigned wavelength; all the measurements occur in parallel such that the raw data comprises a complete spectral acquisition.

In a spectrophotometer, higher light transmittance provides more robust data. This was the guiding principle for designing the nova II, which maximizes light throughput while eliminating traditional sources of noise (e.g. focusing mirrors).

Features

- Produces full UV-Vis 200-800nm absorbance spectrum in real time at ~1nm resolution
- Pulsed xenon light source with extremely stable performance and long lifespan (avg. 5 years)
- Special holographic grating physically separates signal into constituent wavelengths for dispersive analysis
- Rugged, solid state build — no moving parts or superfluous reflective elements
- High signal:noise ratio due to CMOS analog circuitry and high-grade solid state optics
- Ethernet interface for remote access

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Technical Data	
Dispersive Method	Flat field grating (aberration corrected)
Focal Length	70 mm
Spectral Range	200 nm to 800 nm
Aperture	f/2
Resolution	<1 nm with a slit of 25 µm width
Stray Light	<0.1% at 340 nm
Dispersion	25 nm/mm
Wavelength Accuracy	<0.5 nm (with mathematical fit)
Reproducibility	<0.1 nm
Dimensions	107.5 mm W x 101 mm H x 50 mm D
Driver Information	Details: High dynamic range with 16-bit pixel resolution; 16-bit processor at MCU 30 MHz; Integration time from 5 ms to 5 s; USB link operating at 3 Mbyte/sec; Windows™ OS driver Power supply: 12 V 1 A max. for CMOS CCD

Grating Specifications

Spectral Range (nm)	Optimized at WL (nm)	# Grooves (l/mm)	Blazed	Avg. Dispersion (nm/mm)	Spectral Length (mm)
190 - 800	250	477	N	25	25.4
190 - 1050	250	365	N	30	28.6
190 - 1050	250 & 500	365	Double	30	28.6
330 - 750	350	582	N	16	25.4
350 - 800	500	582	Y	16	25.4
350 - 1050	500	365	N	30	25.4
650 - 1020	675	365	N	30	12.7

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