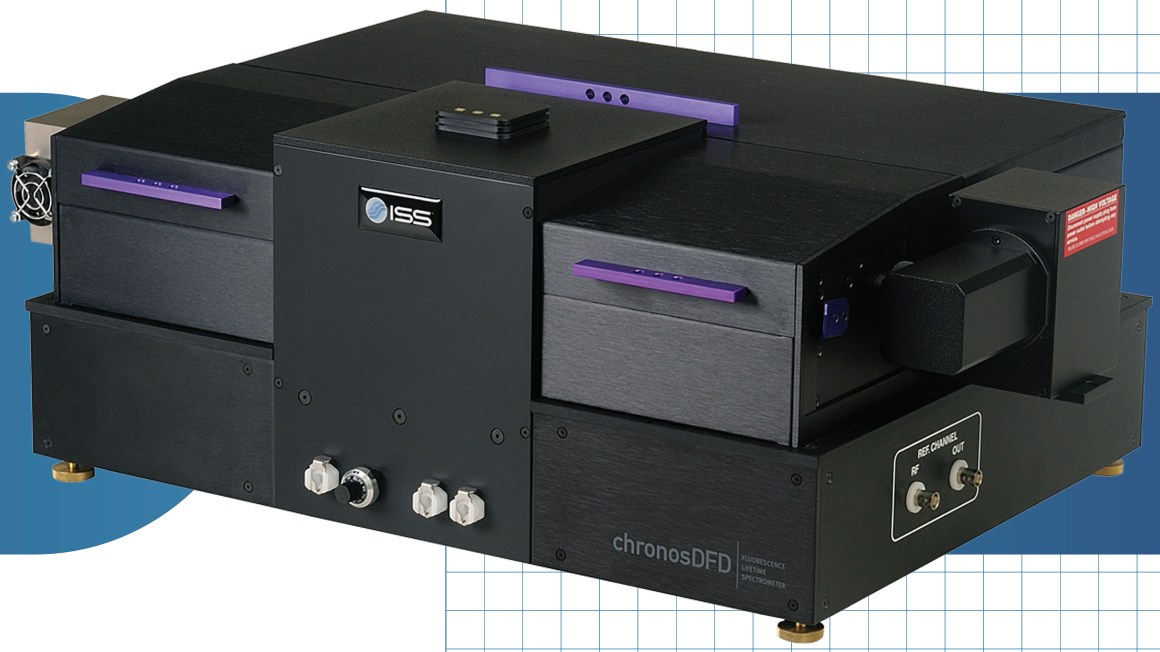
Innovation is What We Do at ISS

ChronosDFD

Digital Frequency Domain Spectrofluorometer



ChronosDFD is capable of measuring decay times of fluorescence and rotational correlation times of complex fluorescence mixtures in 1 second with an accuracy of a few picoseconds. The novel instrument opens a number of applications until now hindered by the duration of the acquisition: the capability of measuring fluorescence decay in a short time makes the instrument usable for measuring fast kinetics processes; the decay times of mixtures in a stopped flow apparatus and in chromatography; and lifetimes in samples where the exposure to light has to be minimized in order to avoid photobleaching.

Steady-State Measurements

- Intensity Measurements at Fixed Wavelengths
- Dual Wavelength Emission-Ratiometric Measurements
- Polarization (Anisotropy) Measurements at Fixed Wavelengths
- Slow & Fast Kinetics

Time-Resolved Measurements

- Frequency Responses of Single & Multi Exponential Decays
- Anisotropy Decays
- Phase & Modulation Resolved Kinetics
- Phase & Modulation Resolved Spectra
- Time Resolved Spectra
- FRET

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Software Specifications

Vinci – Multidimensional Fluorescence Spectroscopy, a powerful software package that provides several ready-to-use routines for reliable, user friendly acquisition of complex fluorescence data:

- Spectra (excitation, emission, synchronous, time-resolved & polarization)
- Measurements at fixed wavelengths (intensity & polarization)
- Measurements of kinetics
- Time-resolved measurements (lifetimes & rotational correlation times)

Key Features

- Flexible instrument configuration w/ a variety of light sources (laser diodes, LEDs, Supercontinuum & Ti Sapphire Laser)
- Second to picosecond lifetime measurement capabilities using the same hardware
- Complete lifetime scans in one second on routine samples w/ proprietary digital frequency domain technology
- A compact footprint & short optical path length for maximum sensitivity & efficient light coupling into the sample
- T-format & parallel beam optical design for fast & precise polarization measurements
- Full automation of instrument components including: cuvette holder, polarizers, shutters, filter wheel, monochromators & stirrers
- PC-controlled integration of temperature bath, titrator, stopped-flow apparatus & pressure pump
- User selectable data acquisition display: time-domain or frequency-domain

Data Analysis

Decay Times

Decay time analysis is performed on multiple data sets using various models including multi-exponential, non-exponential & lifetime distributions.

Rotational Correlation Times

Anisotropy decay data analysis of up to three species using models for isotropic, anisotropic & hindered rotators.

Phase- & Modulation-Resolved Spectra

Vinci also includes routines for the separation of up to three components in phase- and modulation-resolved spectra.

Phasor (Polar) Plot Analysis

A powerful graphical approach to fluorescence decay data analysis used to quantify individual components of a mixture, FRET processes & excited states reactions.

Data Display & Export

- 2D & 3D display w/ user-defined colors & fonts
- 3D surface rotation & in/out zooming
- 3D display of user-defined functions
- Cursor identification of XY spectra coordinates
- Time-resolved spectra display as 3D & center of gravity plots
- Export to gif, png, jpeg, bitmap & metafile formats
- Data are generated & exported in ASCII format

Instrument Specifications

Light Source:

- Laser diodes (nm): 370, 405, 436, 473, 635, 690, 780, 830
- LEDs (nm): 280, 300, 335, 345, 460, 500, 520
- Pulsed Lasers: Supercontinuum, Ti:Sapphire, Pulsed Laser Diodes

Focusing & Collection Geometry: Parallel beam design for precise polarization measurements

Polarizers: UV grade Glan-Thompson with L/A=2.0

Detectors:

- Fast PMT
- Hybrid PMT
- APD

Detection Modes: Photon counting electronics

Wavelength Range: 200 nm to 1700 nm (detector dependent)

Max Counts Range: Up to 80 million counts/s (using hybrid detectors)

Lifetime Measurements Range: 10^{-12} s to 1 s

Operating System: Windows 10

Power Requirements: Universal power input: 110 - 240 V, 50/60 Hz, 400 VAC

Dimensions (mm): 540 (L) x 425 (W) x 235 (H)

Weight (kg): 25

How it Works

The ChronosDFD uses the unique digital frequency domain technology. The light sources (laser dioded and LEDs) are modulated using square pulses of about 2 nanosecond duration with a repetition rate selected by the user and in the range from 0.05 Hz to 80 MHz. The frequency signal contains the fundamental frequency at the repetition rate and its harmonics for up to thirty; that is, when the fundamental frequency is, for instance 10 MHz, harmonics at 20, 30, 40 and all the way up to 300 MHz are generated. The detector photons are separated into phase bins depending upon their individual phase shift and demodulation until a phase histogram is built; from the histogram the decay times are determined.

Information & specifications are subject to change without notice.

For more information and a complete list of accessories for ChronosDFD please visit www.iss.com.

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