



Two in One!

Duetta™

Winner of the 2018 Pittcon Today
GOLD Excellence Award

A Superior Spectrometer Concept

- Two-in-one Fluorescence and Absorbance Spectrometer
- UV-Vis-NIR Fluorescence Detection Wavelength Range from 250 to 1,100 nm
- Full 3-D Fluorescence EEM Acquisition in Less Than One Second
- Best in Class Fluorescence Sensitivity Specification of 6,000:1 RMS for Water Raman
- Automatic Correction for Primary and Secondary Inner Filter Effects (IFE)
- High Fidelity Molecular Fingerprinting with Unique A-TEEM™ (Absorbance-Transmittance Excitation Emission Matrix) Technology
- Millisecond CCD Detection of Entire Fluorescence Spectrum

Fluorescence and Absorbance in one Spectrometer!

Duetta can be used as a fluorometer, as a UV-Vis-NIR spectrometer to measure absorbance, or as an instrument that measures true molecular fingerprints, which require the acquisition of fluorescence and absorbance, correcting for IFE in real time.

Fluorescence in the Blink of an Eye!

Duetta's ultra-fast, state-of-the-art CCD technology allows it to outperform, by orders of magnitude, any competitor using PMTs. It's the fastest bench-top fluorometer in the world, and the only fluorometer that can acquire a full spectrum in less than 100 milliseconds! This state-of-the-art CCD technology also extends NIR wavelength detection to 1,100 nm, well beyond the limit of a standard PMT fluorometer.

Highest Fluorescence Sensitivity in its Class

Having the highest level of fluorescence sensitivity means that Duetta's optimized design lets you measure lower concentrations of a sample, and provides better quality data.

EzSpec™ Touch-Screen Software

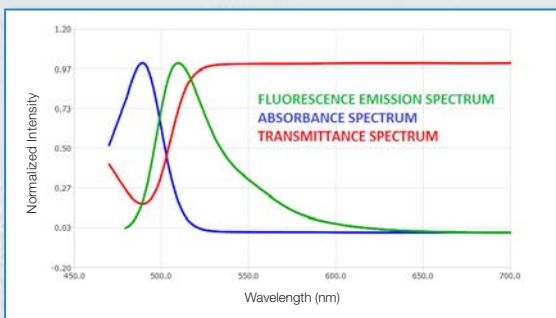
HORIBA debuts Duetta's new generation software interface with touch-screen utility, and a selection of Apps for routine analysis.



The Future of Fluorescence



A New Spectrometer Design

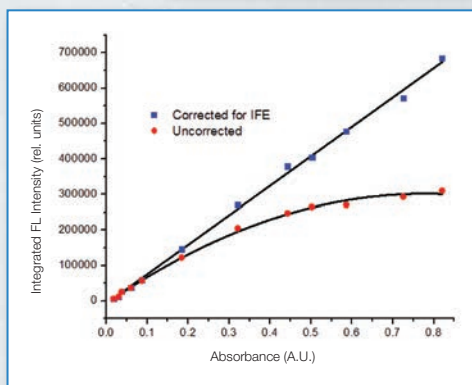


Fluorescence and Absorbance

Duetta's two specialized sample detectors collect fluorescence at right angles to the excitation light, and absorbance straight through the sample.



**Ergonomic,
Hands Free,
Sample Access**



Absolute Fluorescence Spectra with Real Time Inner Filter Effect (IFE) Correction

IFE limits the linearity of the fluorescence signal at higher sample concentrations due to primary and secondary re-absorption of fluorescence. Duetta's unique design applies real time IFE correction to obtain absolute fluorescence spectra at higher sample concentrations.



Easy Lamp Replacement

Lamp cartridges are pre-aligned at the factory, guaranteeing perfect alignment upon snap-in replacement. No tools or service are required.



Smart Sample Accessory Trays

Switching from one type of sample holder to another could not be easier.

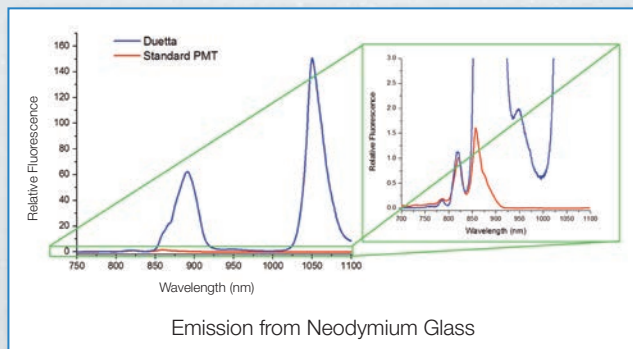
Without any tools or cables, Duetta's spill-proof sample accessory trays are identified by EzSpec software, enable electrical power for the appropriate module (e.g. 4-position Peltier holder), and read an enabled sensor (e.g. temperature), if available.

CCDs Collect the Entire Emission Spectrum

Duetta's CCD detection takes a snapshot of the entire fluorescence emission spectrum from 250 to 1,100 nm, so, not only is it much faster, but it also gives much more information than the competition.

Extended NIR Wavelength Range up to 1,100 nm

Near Infrared applications are growing rapidly, and Duetta is ready to meet the challenge with fluorescence detection from 250 to 1,100 nm, well beyond the reach of standard PMTs.



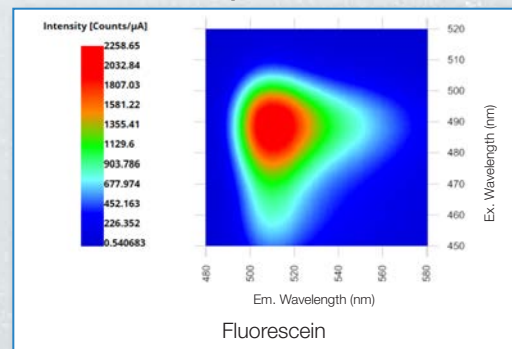
Emission from Neodymium Glass

NIR detection comparing Duetta with PMT.

Fully Automated Order Sorting Filters

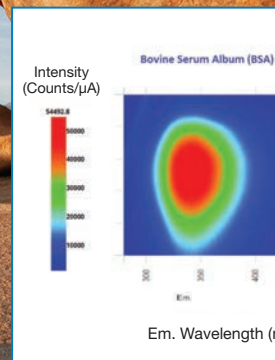
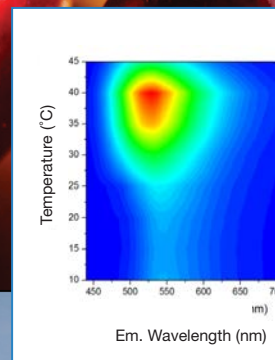
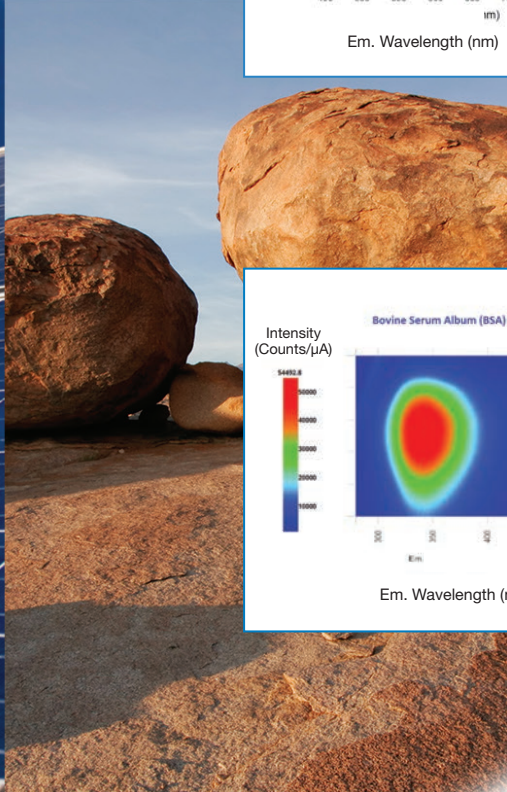
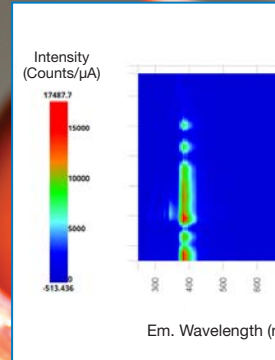
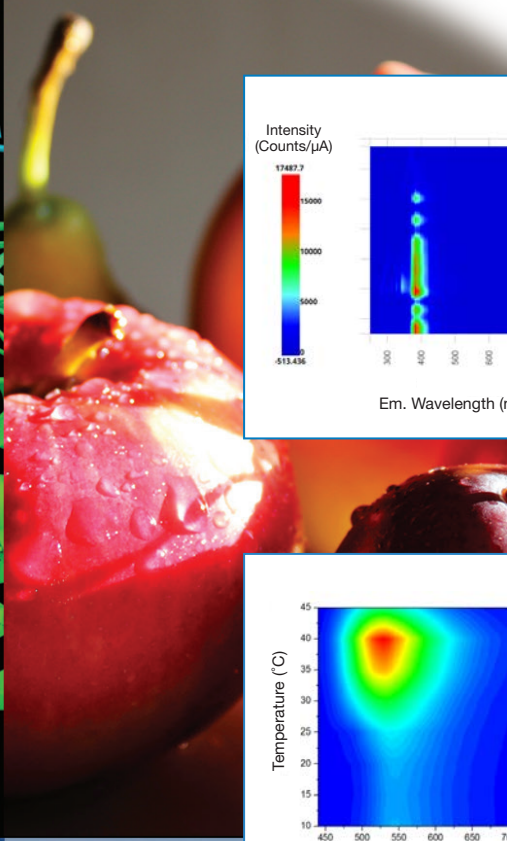
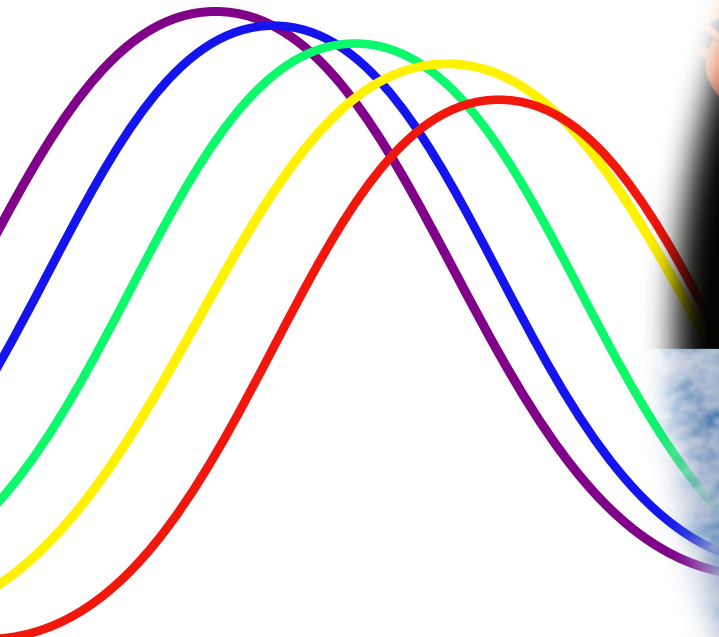
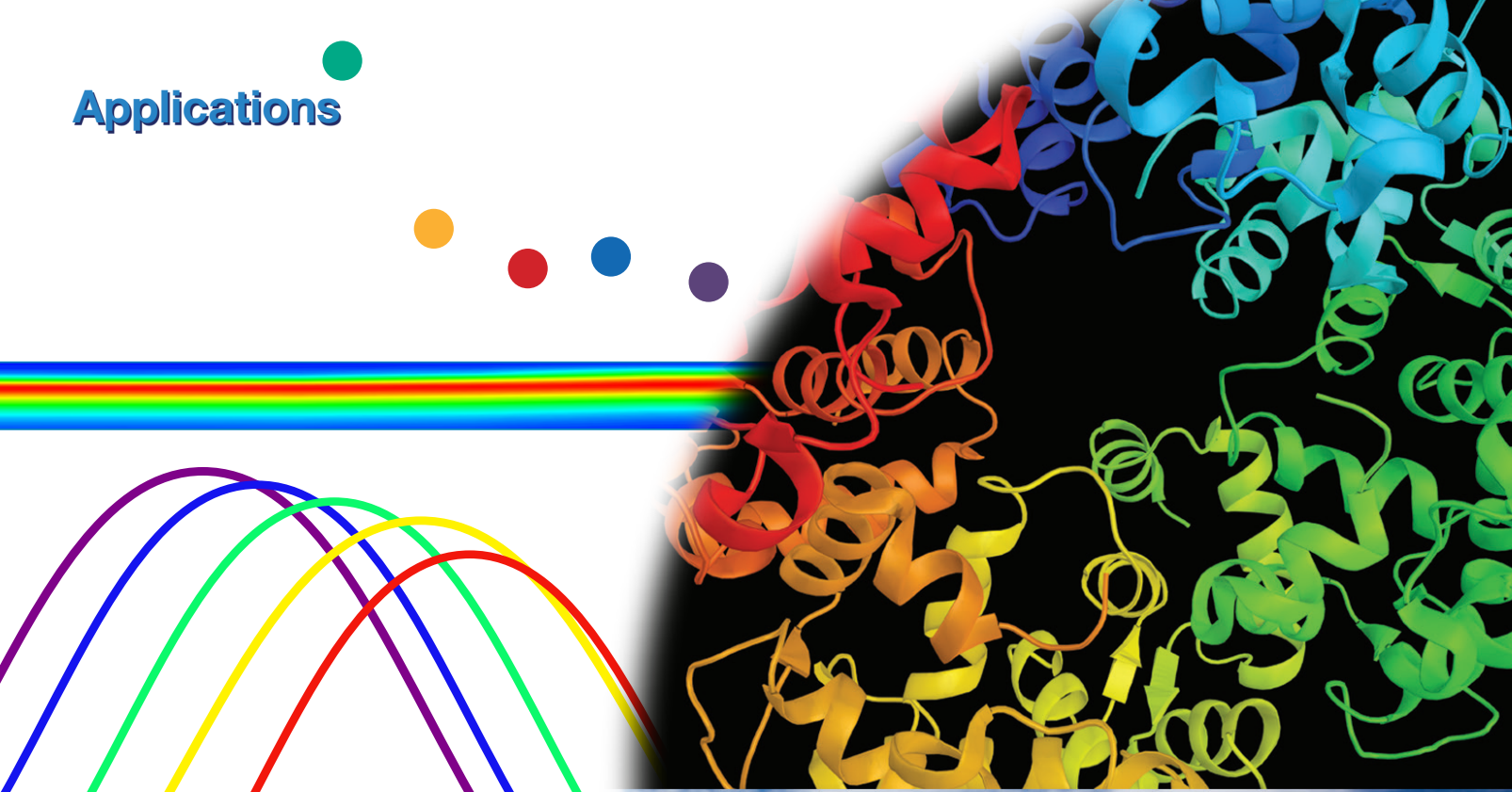
Duetta includes excitation and emission cut-off filters for automated elimination of second order grating effects, which otherwise interfere with the fluorescence signal of interest.

EEMs Acquired in Seconds



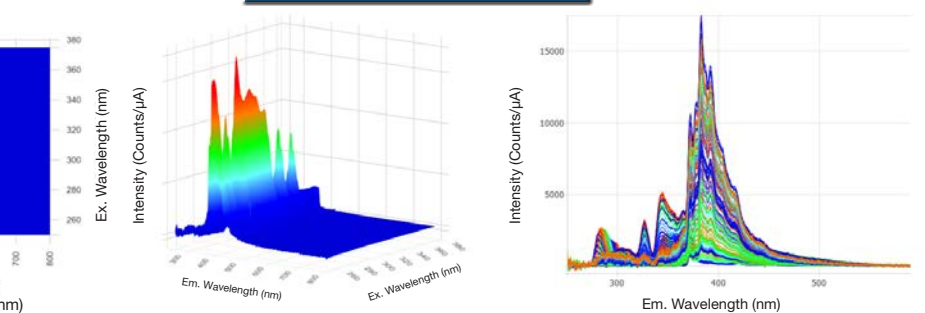
Excitation Emission Matrix (EEM) acquired in 1 second, shows no second order scattering.

Applications



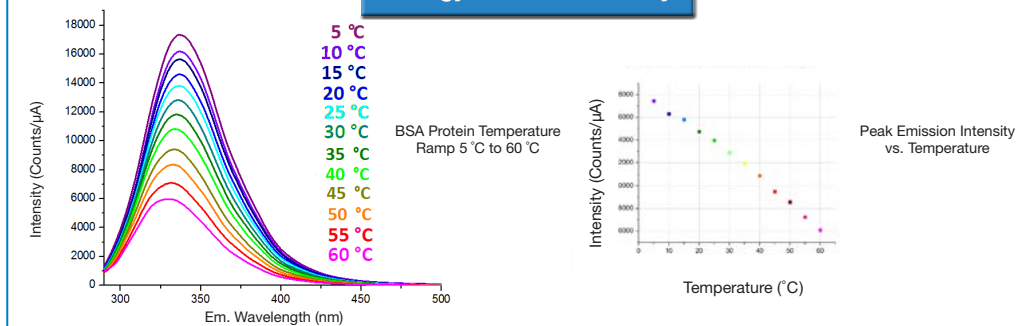
Chemistry
Life Sciences
Materials Research
Food Science
Earth Sciences

Chemistry/Photochemistry



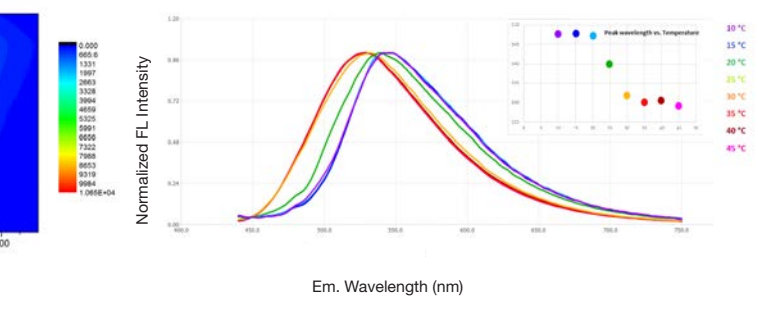
Pyrene in a solution of A-B-A triblock copolymer micelles is solvated in the hydrophobic core solvent environment. 3D EEMs can be shown in contour, waterfall plot, or 2D overlay mode.

Biology and Biochemistry



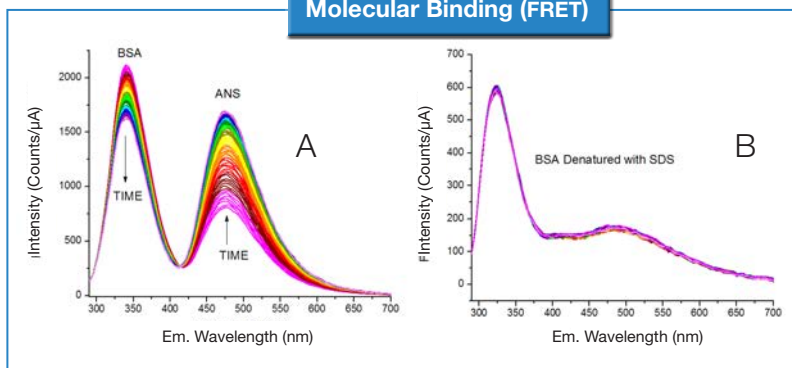
BSA protein measured from 5 °C to 60 °C and the peak intensity and peak wavelength are plotted vs. temperature of the protein solution. Measured using the SampleSnap-4Pelt 4-position Peltier temperature-controlled cuvette holder.

Materials



Polymer Aggregation and Structure. Temperature dependent spectra showing polymer micellization.

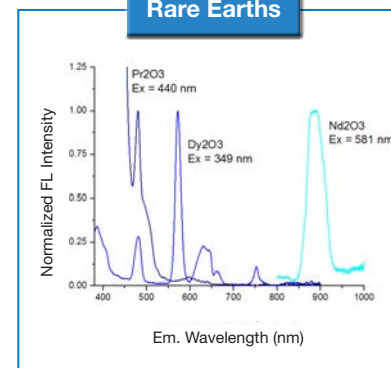
Molecular Binding (FRET)



A. Kinetic spectral scans of native BSA protein with rapidly added ANS (3x10⁻⁶ M). Spectra taken every 100 ms after ANS addition. As ANS binds to native BSA, the BSA Trp emission decreases and the ANS emission increases as a result of FRET, due to proximity of excited Trp and ANS.

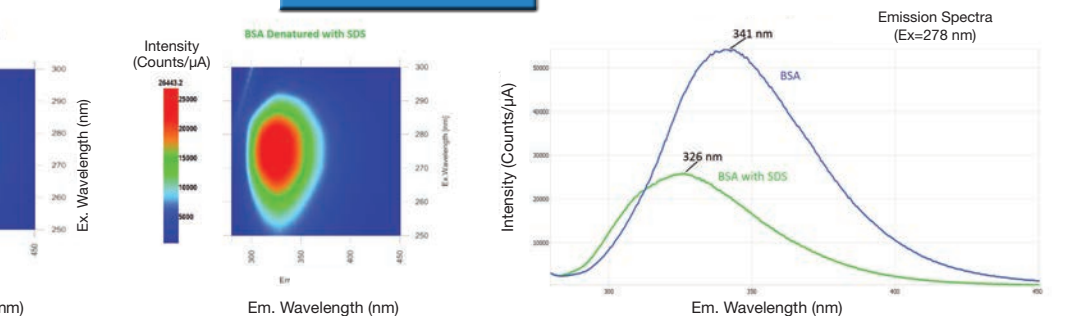
B. Kinetic spectral scans of SDS-denatured BSA after addition of ANS. Much higher ANS concentration (4x10⁻⁵ M) is required to affect binding to denatured BSA; no FRET is observed due to increased distances between ANS and Trp.

Rare Earths



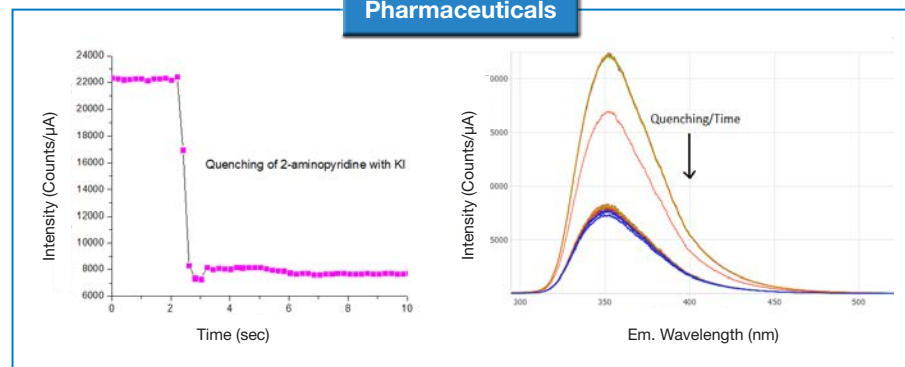
Emission spectra of a series of glass materials containing different lanthanides. Measured using the SampleSnap-Uni solid sample holder.

Protein Biophysics



Comparison of bovine serum albumin protein and the same protein denatured by sodium dodecylsulfate (SDS). The emission peak narrows and shifts 15 nm to the blue.

Pharmaceuticals



Quenching: Fluorescence monitoring of the titration of 1 M potassium iodide (KI) into a solution of 2-aminopyridine, a common small molecule drug pre-cursor.

EzSpec Software

Apps at your Fingertips

From the EzSpec™ launch screen, each App icon intuitively helps you identify and select the analysis you want to perform with a simple point and touch.



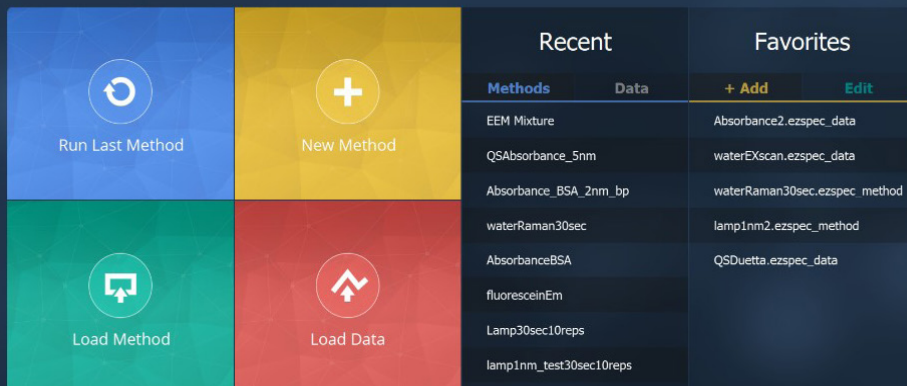
Standard Apps:

- Autonomous Acquisition
- Pass/Fail
- Build/Use a Concentration Curve
- Protein A280

Upcoming Apps:

- RNA/DNA Purity A260/280
- Concentration from Absorbance
- FRET
- Ion Kinetics
- CIE Colorimetry
- Enzyme Kinetics

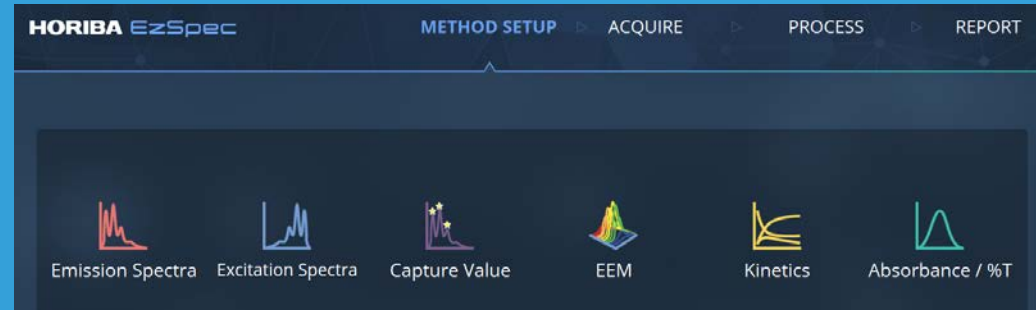
EzSpec makes your most recent methods and data easily accessible.



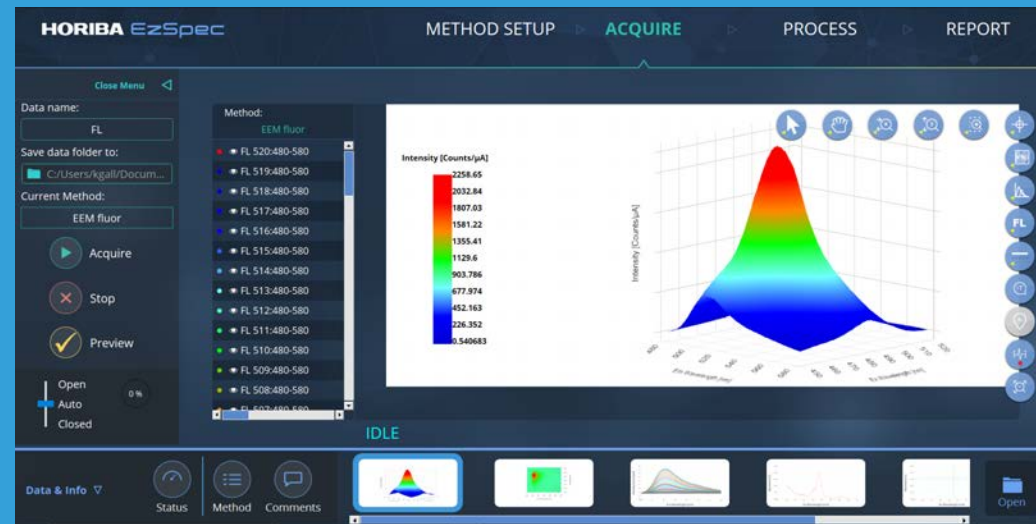
Widest Range of Spectroscopic Acquisition Modes:

- Fluorescence emission spectra **plus Abs & IFE***
- Fluorescence excitation spectra **plus Abs & IFE***
- Capture fluorescence value **plus Abs & IFE***
- Fluorescence EEM **plus Abs & IFE***
- Fluorescence kinetics (**emission spectra*** or single point intensities)
- Absorbance and % Transmittance (spectra or kinetics)

* Unique to Duetta



Acquire Menu:



PDF Report Generator or Data Export:

- Includes data and results of fitting/processing
- Full method details
- 2D and 3D graphs
- Instrument and user identification information
- Customizable logo
- Optional and customizable signature fields
- Full data and method traceability

Accessories

Optional Sample Holder Trays

SampleSnap-WJ: Thermostated and Micro-Stirred Cuvette Sample Tray

Self-identifying thermostatable, water jacketed cuvette holder (1 cm) with magnetic micro-stir motor. The sample tray can be installed in seconds without the need of a tool, and provides power for micro-stirrer. Requires, but does not include, external water bath.

SampleSnap-1Pelt: Single Cuvette Peltier Holder Sample Tray

Self-identifying single cuvette Peltier holder (1 cm) for automated temperature control and ramping from -15 °C to +105 °C, with magnetic micro-stirrer. Sample tray can be installed in seconds without the need of a tool, and provides power and control of the Peltier device, and reads temperature. Includes external water circulator for heat sink.

SampleSnap-4Pelt: Four Position Peltier Cuvette Sample Tray

Self-identifying four position Peltier holder (1 cm) for automated temperature control and ramping from -15 °C to +110 °C, with magnetic micro-stirrers under all four positions. Sample tray can be installed in seconds without the need of a tool, and provides power and control of the Peltier device, and reads temperature. Includes external water circulator for heat sink.

SampleSnap-UNI: Universal Variable Angle Sample Tray

Self-identifying sample holder with 360 degree variable angle goniometer for empirical determination of optimum sample angle. Sample tray can be installed in seconds without need of a tool. Requires, but does not include, solid sample holder accessory (SampleSnap-SS), powder sample holder accessory (SampleSnap-PWD) or cuvette holder accessory (SampleSnap-VACVT).

Sample Accessories for SampleSnap-UNI: Universal Variable Angle Sample Tray

- **SampleSnap-SS: Solid Sample Accessory**

Solid sample accessory for universal sample holder to be used with flat or solid samples such as thin films, cover slips, paper, gemstones, and more. Requires, but does not include, SampleSnap-UNI.

- **SampleSnap-PWD: Powder Sample Accessory**

Powder sample accessory for universal sample holder. Requires, but does not include, SampleSnap-UNI.

- **SampleSnap-VACVT: Variable Angle Cuvette Sample Accessory**

Cuvette sample accessory for universal sample holder. Requires, but does not include, SampleSnap-UNI.

Additional Accessories

K-210: Six pack of quartz windows for powdered sample holder

K-151: 10 mm quartz cuvette

LampSnap: Replacement Duetta light source assembly with pre-aligned Xenon arc lamp

K-AFILTER: Replacement Duetta air intake filter

* Duetta includes a standard room temperature single cuvette sample holder tray.

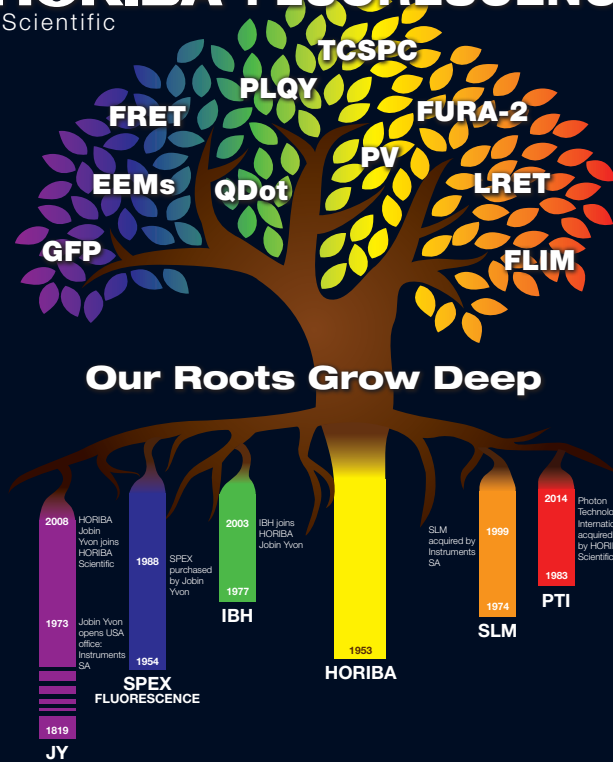


Duetta Specifications

	Duetta	Duetta-Bio
Acquisition Modes	Absorbance and Fluorescence Spectrometer	
Fluorescence Sensitivity	Water Raman SNR >6,000:1 RMS, 350 nm excitation, 5 nm slits	
Spectral Acquisition Rate	510,000 nm/min	
EEM Acquisition Rate	As fast as 1 second (sample and wavelength dependent)	
A-TEEM Acquisition Rate	As fast as 30 seconds (sample and wavelength dependent)	
Fluorescence Detector	CCD / Spectrograph	
Fluorescence Detector Range	250 to 1,100 nm	
Fluorescence Bandwidth	1, 2, 3, 5, 10, 20 nm (excitation and emission)	
Light Source	75 W Xenon arc lamp. Dedicated cartridge for snap-in replacement	
Excitation/Absorbance Wavelength Range	250 to 1,000 nm	
Absorbance Detector	Silicon Photodiode	
Absorbance Detector Range	250 to 1,000 nm	
Absorbance Bandwidth	1, 2, 3, 5, 10, 20 nm	
Absorbance Range	0 to 2 A	
Absorbance Accuracy	+/- 0.02 A	
Wavelength Accuracy	+/- 1 nm	
Computer Requirements	Windows® 7/8/10 Laptop or PC with 1 USB	
Software	EzSpec	
Dimensions (W x D x H)	17 x 20.4 x 14.4 inches; 43.18 x 51.816 x 36.576 cm	
Weight	45 pounds; 20.4 kg	
Polarizers (Time of Purchase)	Not Available	Yes (280 to 750 nm)

HORIBA FLUORESCENCE

Scientific



Our Roots Grow Deep

HORIBA has a long history of global leadership in high performance fluorescence research instrumentation.

Now, with the introduction of Duetta, HORIBA has perfected an affordable spectrofluorometer that takes advantage of decades of experience in fluorescence. (Think SPEX, Jobin Yvon, SLM, IBH, PTI and HORIBA).

HORIBA.com/Duetta

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