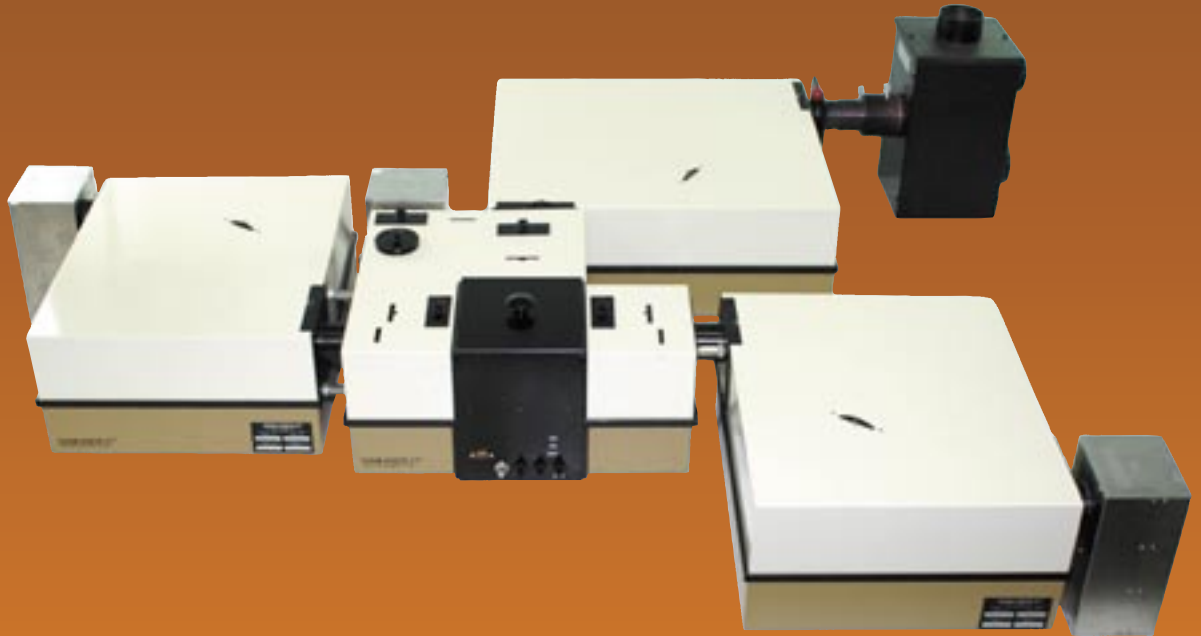


The Olis[®] Line of SLM-based Spectrofluorimeters



Modernize to Create Today's Best

Days after an old SLM spectrofluorimeter arrives at Olis, Inc., an effectively brand-new scanning spectrofluorimeter with Windows XP computer control emerges. The modernized instrument is optically and operationally similar (or superior) to systems costing 50% to 100% more.

In their prime, SLM spectrofluorimeters were recognized as the best fluorescence systems available. Many of these models survive today, saddled with old electronics and unreliable motors. The optics remain perfect, but the instruments are not used.

At Olis, we replace all of the complex and problematic hardware with simple modern electronics and new motors. The ageless detectors are retained and used with all new circuitry.

The original 450 watt xenon arc lamp, housing, power supply and fan cooling are retained if they are in excellent condition. Otherwise, brand-new components are available.

Original accessories can be retained, computerized, or replaced, as needed. New accessories by Olis, Inc. or many third parties can be added.

Our twenty years of modernizing SLM instruments allow us to produce a spectrofluorimeter exactly right for your most challenging experimental situations.

And jointly, we save a world-class optical system from an unnecessary end.

Identifying the Hardware

SLM Instruments, famous in the 1980s for their superb spectrofluorimeters, identified their models as the SLM SPF-500[C], SLM 4800, SLM 8000, and SLM 8100. Some of these models had two monochromators, some had three. Some of the monochromators were single gratings, other were double.

The older monochromators had manual everything: slits, shutters, polarizers, sample holders, data acquisition. The newer models occasionally had motorized control of accessories.

Just as each SLM could vary from another, so our treatment of each is unique. It is very important that a given model is very clearly described, so that all preparations for suitable motors, electronics, and computerization can be made, especially if modernization 'in the field' is requested. Even modernization at the Olis facility must be prepared for correctly.

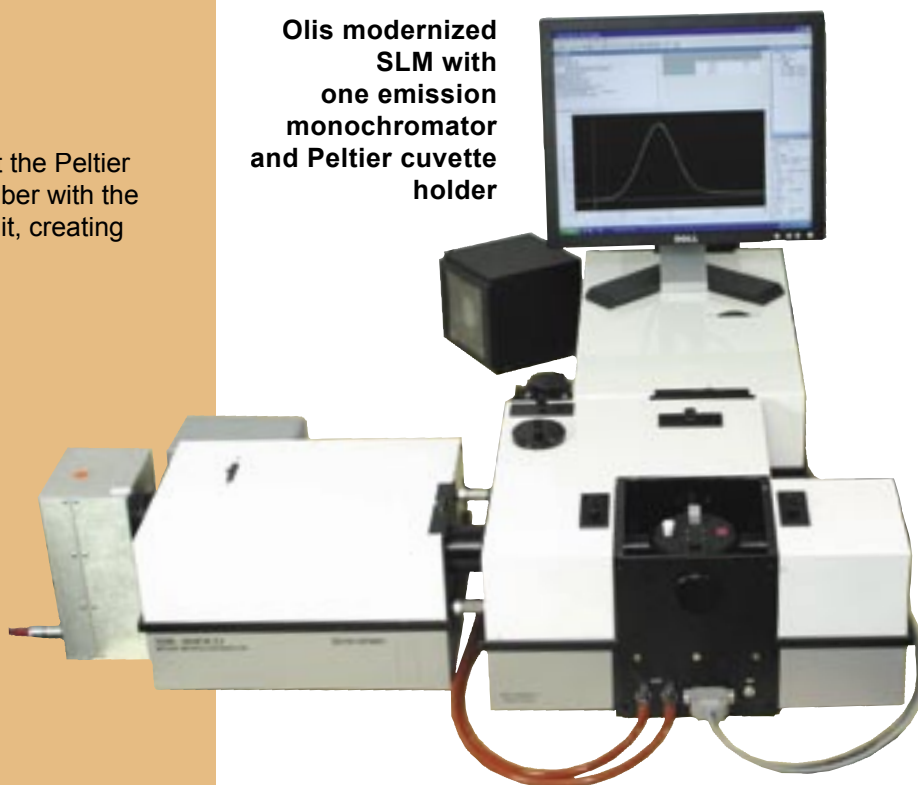
On the cover, a model with a double grating excitation and two single grating emission monochromators is shown. Below, a model with a double grating excitation and one single grating emission is shown.

Insulated orange lines connect the Peltier cell holder in the sample chamber with the Olis Peltier Heat Exchange Unit, creating a closed cycle cooling system.



Olis Peltier Heat Exchange Unit

Olis modernized SLM with one emission monochromator and Peltier cuvette holder



SLM Optics, Detectors, Lamp Components are Retained

The optics within the monochromators will be pristine, unless they were somehow damaged. Damage is possible if the monochromators were opened, so that dust or organics could settle on the mirrors and gratings, or if the optical surfaces were scratched or cracked. In the infrequent cases of damaged optical surfaces, recoating or replacement is possible. Such instances are very rare but can be reversed at very modest cost.

All original photomultiplier tube detectors are retained. If the original PMT had cooling, this will be retained. New amplifier circuitry is used with the detector(s). Original photon counters will not be used, as they were exceedingly complicated and problematic. However, new photon counters which have higher sensitivity and solid reliability can replace the originals.

The lamp housing is retained (photo 1). The original xenon arc power supply – quite expensive to replace – is retained if it is still reliable (photo 2). A new power supply for a 450-watt lamp will add several thousands of dollars to the price of the modernization. A new 450 watt lamp is included in the cost of the modernization; spare lamps can be purchased, too. The original cooling box for the lamp is also retained (photo 3), or a new Olis Twin Fan closed cycle box can be purchased (photo 4).



Olis Electronics and Computerization are Added



Freestanding electronics and tower PC are used to control the monochromator movements, signals to and from the detectors, and data manipulation.

The small tan box in foreground is the control electronics for the optional Peltier accessories (see page 6).

All electronics are replaced. Electronics by Olis are housed in a freestanding tower. Electronics include everything required to control the monochromators, detectors, and accessories. Should a problem arise with these modern circuit cards, amplifiers, and power supplies, the tower can be unplugged and shipped to Olis for diagnosis and repair.

Electronics can be far simpler today than decades ago because of the power of today's computer hardware and software. Operations which once had to be handled by complex circuitry is now executed by digitizing the signal and letting the software do the number crunching. Olis electronics are elegant in design and function, supported by the comprehensive Olis SpectralWorks software.

The PC is a fully equipped 3 GHz model with a 17" color LCD monitor. A color printer is included.

The A/D card used for data acquisition will be either a 15 bit 500 kHz model or a 12 bit 20 MHz, with the latter preferred when kinetic experiments, especially with a stopped-flow are done (see page 7).

The exclusive Olis software package handles instrument control of all components in the SLM spectrofluorimeter, including accessories. Data acquisition is done in real time; data are plotted as they are acquired. Incoming data can be displayed in raw form or after baseline or ratio collection.

Scanning speeds are variable based on the steps per nanometer, number of points to average per retained datum, and the individual monochromator. The fastest scan rate is the standard one, set to produce reproducible results and quiet performance.

Olis SpectralWorks Software

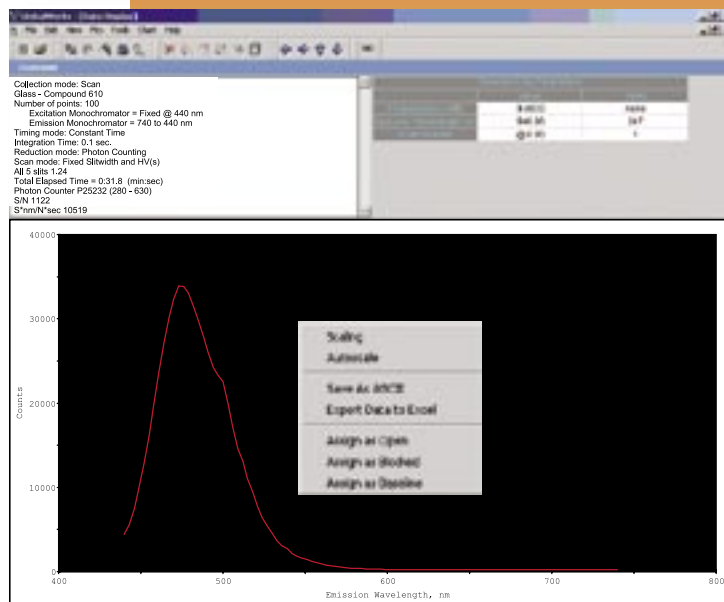
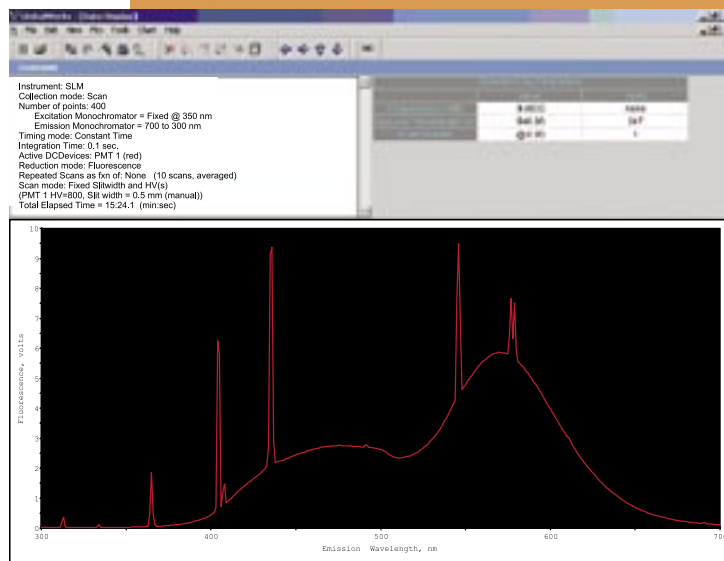
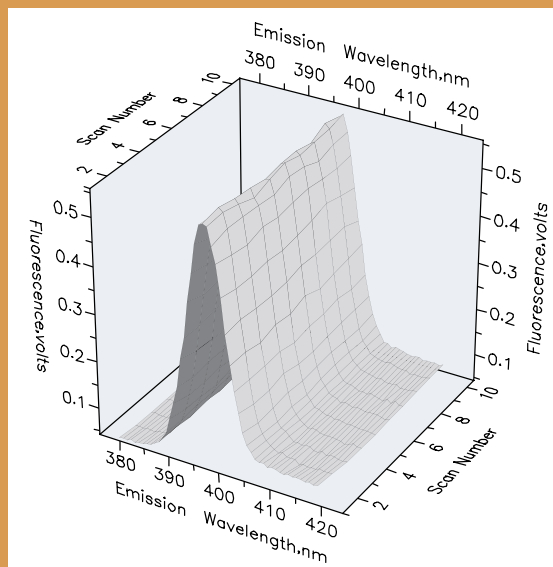
Data presentation includes full-screen spectra or kinetics, or a split screen presentation with both in individually scaled graphs. Three-dimensional data presentation can be rotated on any of the three axes for just the right perspective.

Data analysis includes nearly 100 algorithms for fitting and analyzing 2D and 3D data files.

A comprehensive brochure is available on Olis GlobalWorks, the data presentation and analysis module of the comprehensive Olis SpectralWorks data acquisition/ instrument control software.

No effort was made to duplicate the original SLM software. Olis SpectralWorks is the software common to all Olis computerized instruments, with distinct features based on which spectrophotometer or spectrofluorimeter is being controlled and with which accessories. If there was any functionality in the original SLM software which remains essential to you, please confirm its presence in the Olis software.

The Olis software supports collection from photomultiplier tubes (standard) and photon counters (optional add-ons), as shown here. Raw and analyzed data can be exported to ASCII and Excel file formats with a simple right-click.



What Else Can Be Added?

Almost anything! From polarizers and photo-elastic modulators to magnetic stirring blocks and water baths, accessories from Olis, SLM, and third party sources can be added, computerized, and supported. A separate document provides complete details on many accessory choices. Here is an introduction.

Polarization of fluorescence is added in T-format or L-format. A third choice, exclusive to Olis, Inc., is the photo-elastic modulator format, which obviates the need for a G factor and multiple measurements, saving time and the likelihood of systematic error.¹

Temperature control comes in the form of single or multiple position cell holders. Shown at left is the single cell and the four position cell holders made for us by Quantum Northwest. Olis custom mounts these accessories and has direct computer control of them. Each is easily removable so that other sample holders can be substituted.

Automatic titration is possible with one of the four titrators made at Olis, Inc. The most complex, a four position Peltier regulated model, is shown here. Two syringe and ambient temperature models are available at lower cost. All four styles produce the new sample mixture in a closed cycle manner with complete mixing within the titrator itself. Thus, the sample stays out of the measuring beam except during the measurement, and anaerobic conditions can be maintained, and stirring within the cuvette is not required.



QNW Peltier Cell Holder



4 Position Peltier Cell Holder



Four Syringe Peltier Titrator

¹ For additional details, see Wampler and DeSa, Anal. Chem, v 46, 563-567, 1974.

Adding an Olis USA Stopped-flow

Quickly and easily mount an Olis USA stopped-flow to add millisecond mixing to an Olis modernized SLM.

The front plate of the original sample compartment unbolts. When it is removed, the cuvette holder is removed with it, opening the space for the Olis stopped-flow.

The mounting hardware is shown without the stopped-flow attached to it. Notice the skillful machining which produces perfect nesting around the tubes directing light from the excitation monochromator and into the emission monochromator(s). This mounting hardware is bolted into position using the same holding screws as held the front plate in place.

Uniquely, Olis stopped-flows have a safety interlock system which guarantees against misfiring, so that samples cannot be lost or syringes broken. Also unique to the Olis USA stopped-flow are valves which are impervious to temperature extremes, corrosives, and oxygen exchange. These ceramic valves mean that your stopped-flow will never leak from the inside out.



Owners of Olis® Modernized SLM Spectrofluorimeters

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National University of La Plata

Finland

Paavo Kinnunen
University of Helsinki

Mexico

Alberto Darszon
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New Zealand

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