

SLP Series Silicon Lithium-Drifted Planar Low-Energy X Ray Detectors

For x-ray spectroscopy with a nuclear accelerator, radioactive source, or x-ray tube.

- Premium performance spectroscopy from 1 keV to 30 keV
- Superior resolution performance at low and high count rates
- Multi-detector arrays available for use at fusion facilities
- Thin Be window
- High peak-to-background ratio
- PopTop flexibility

ORTEC SLP Series Lithium-Drifted Silicon X-Ray Detectors provide the spectroscopist with a highly sensitive, premium performance research tool for detecting x rays from a nuclear accelerator, radioactive source, or x-ray tube. The energy range of detection (Fig. 1) is from 30 keV down to 1 keV, depending on the thickness of the beryllium window.

The x-ray detector consists of a lithium-drifted silicon crystal and a cryogenically-cooled-FET, a high-gain, low-noise hybridized preamplifier in a PopTop capsule with a thin Be entrance window. The ORTEC Si(Li) detector crystal is manufactured under an exclusive process. Special techniques for lithium drifting result in a negligible detector element dead layer whose characteristics will not change even if the detector is stored at room temperature.

The SLP Series Si(Li) detector provides exceptional resolution performance. A pulsed optical feedback preamplifier having an energy rate in excess of 4000 MeV/s* is supplied with the SLP Series detectors.

An ultra-thin Be window (either 0.3 mil and 0.5 mil) is an option.

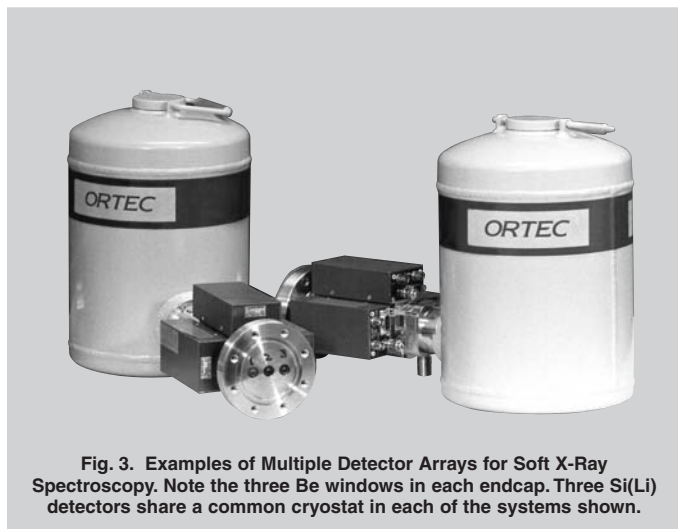
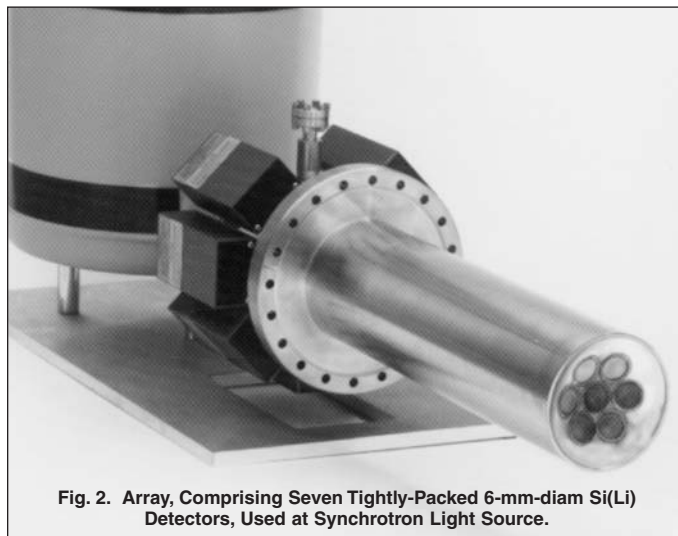
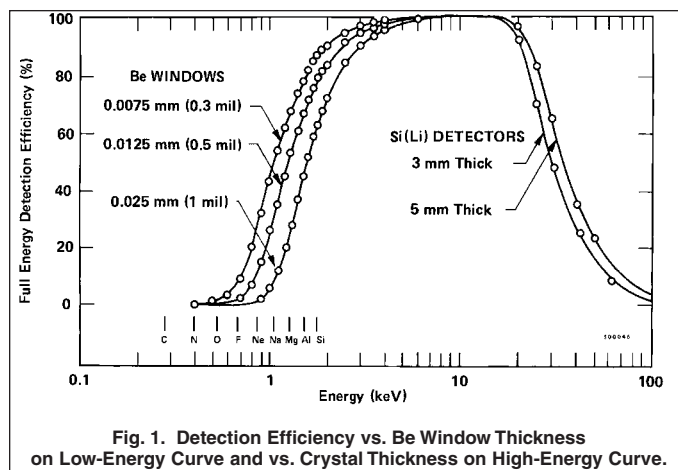
SLP detectors have an exclusive high-rate indicator and high-voltage shutdown protection feature. If the LN₂ supply is exhausted and the detector begins to warm while high voltage is applied, the high voltage will automatically shut off, thus protecting the FET from damage.

As a single element or in multiple detector arrays (Figs. 2 and 3), the SLP Series has become an important tool in soft x-ray spectroscopy in fusion research. Please contact the factory or your local sales representative for specific information on these applications.

An SLP PopTop detector consists of:

- A Si(Li) detector element (Fig. 4) mounted, in most systems, inside the vacuum enclosure of its PopTop capsule.
- A charge-sensitive preamplifier and a HV filter, with accompanying cable pack. The first stage of the preamplifier is also mounted inside the vacuum enclosure to ensure proper cooling for optimum noise and reliability. The second stage of the preamplifier and HV filter are part of the PopTop assembly but reside outside the vacuum enclosure to which they are connected by vacuum feedthroughs.
- A dipstick cryostat with a 30-liter LN₂ dewar or a combination cryostat-dewar assembly.

*The POF does not "lock up" or saturate at high count rates, unlike resistor-feedback designs. At ultra-high count rates with the POF, throughput is limited by reset pulse rates. 4000 MeV/s is an estimate of maximum "useable" energy rate.



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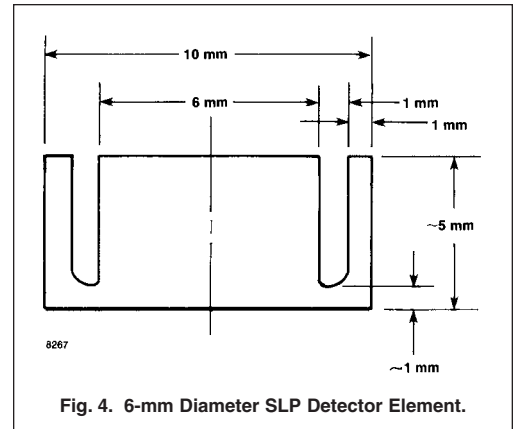
Ordering Information

Supplied in "classic" PopTop capsule. These capsules are compatible with P4 cryostats.

If dimensional considerations are critical, contact factory. For non-PopTop remove the "P" from the model number.

A complete detector assembly requires a cryostat and a dewar.

Model No.*	Diameter (mm)	Area (mm ²)	Energy Resolution FWHM (eV) at 5.9 keV
SLP-04160P	≥4	≥12.5	≤160
SLP-04160P-OPT0.3	≥4	≥12.5	≤160
SLP-04160P-OPT0.5	≥4	≥12.5	≤160
SLP-06165P	6	28	165
SLP-06165P-OPT0.5	6	28	165
SLP-10180P	10	80	180
SLP-16220P	16	200	220



*Unless otherwise specified, each Si(Li) detector is supplied with a 25 μm (0.001 in.) thick Be window, except on the 16-mm-diameter unit, which has a 50 μm (0.002 in.)-thick Be window.

OPT 0.5 = 13 μm (0.0005 in.)-thick Be window for 4- and 6-mm-diameter detectors

OPT 0.3 = 8 μm (0.0003 in.)-thick Be (ultra-thin) unsupported window for 4-mm-diameter detectors

All SLP detectors are supplied with a Pulsed-Optical-Feedback (POF) preamplifier.

Contact Factory for Appropriate Electronics for SLP Detectors.

Specifications subject to change
063008

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