



● **PL II** FT-Photoluminescence Module

Bruker's new PL II is a versatile and powerful external module to the VERTEX Series FT-IR spectrometers for photoluminescence spectroscopy.

Fourier transform infrared photoluminescence spectroscopy has many known advantages over the dispersive approaches, such as the Jaquinot and the multiplex advantages. Optional optical components can help cover a broad detection range from the infrared to the visible. The PL II Module provides higher sensitivity and shorter measurement times especially in the infrared range.

Key Features

- High sensitivity and dynamics
- Visible (532nm) internal excitation laser with software controlled intensity adjustment
- Optional near infrared (1064nm) internal excitation laser
- Optional rear side input port for external lasers
- Modulated excitation option for mid infrared photoluminescence
- Cryostat adaptation for low temperature measurements available
- Accessories for photoluminescence mapping
- Optical components available for PL detection from infrared up to the visible



PL II sample compartment with NIR/VIS objective and standard sample stage.



Automated x,y stage for laterally resolved photoluminescence mapping.



Cryostat adaption for low temperature photoluminescence spectroscopy.

High Performance

The PL II Module utilizes the high performance characteristics of the VERTEX Series research grade FT-IR spectrometers. Data acquisition of the VERTEX FT-IRs is based on two channel delta-sigma ADCs with 24-bit dynamic range, which are running in parallel and integrated into the detector preamplifier electronics. This advanced, patented DigiTect technology prevents external signal disturbance and guarantees the highest signal-to-noise ratio. E.g. in the near infrared spectral range the high gain InGaAs detector D424/H enables outstanding sensitivity even for weak photoluminescence signals.

Versatility

The PL II Module is either available with visible (532nm) or near infrared (1064nm) internal excitation laser. Furthermore, an optional external laser input port allows the usage of other lasers, including the adaptation of your existing laser sources.

When not in use, the PL II Module can be electronically disconnected, allowing the use of the

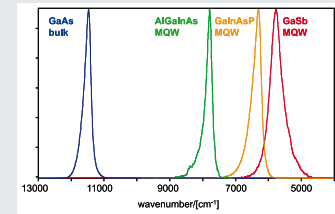
VERTEX spectrometers' sample compartment e. g. for reflectance or transmittance FT-IR measurements.

Mid infrared photoluminescence (below approx. 3500cm^{-1} , respectively $>2.8\mu\text{m}$) typically requires modulated excitation and special detection electronics in order to separate photoluminescence from 300K thermal background radiation. An appropriate modulation option with tunable modulation frequency is available on request.

A cryostat for low temperature photoluminescence including an objective with increased working distance can be adapted to the PLII Module. In conjunction with a high resolution VERTEX spectrometer (0.06cm^{-1} are optionally achievable) such measurements can give valuable insight e. g. for solid state physicists and chemists.

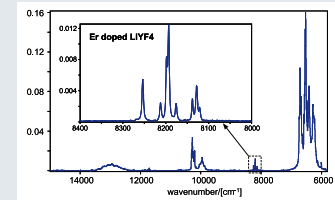
For laterally resolved photoluminescence mapping, there are automated x, y and x, y, z stages available.

PLII Example Spectra with 532nm excitation



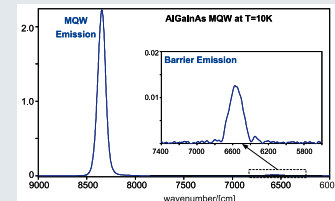
Room temperature PL of multiple quantum wells (MQW's) and a GaAs bulk sample with 532nm excitation. Typical measurement parameters:

Meas. duration: ~10s
Resolution: ~ 50cm^{-1}
Laser intensity: ~20mW
Detector: InGaAs



Room temperature PL of Er doped LiYf4: The narrow PL bands are clearly resolved.

Meas. duration: ~1min
Resolution: ~ 2cm^{-1}
Laser intensity: ~40mW
Detector: InGaAs



Low temperature PL of an AlGaInAs multiple quantum well at 10K (Data from Walter Schottky Institute, Technical University of Munich). The barrier PL (shown in the inset) is approximately 170 times weaker than the MQW PL but can clearly be measured within less than 10 seconds.

Meas. duration: ~7s
Resolution: ~ 16cm^{-1}
Laser intensity: ~10mW
Detector: InGaAs

Bruker Optics is ISO 9001 certified.

VERTEX: Laser class 2

When operated with internal excitation laser, the PLII module is a laser class 1 product.

www.brukeroptics.com ● Bruker Optics Inc.

Billerica, MA · USA
Phone +1 (978) 439-9899
Fax +1 (978) 663-9177
info@brukeroptics.com

Bruker Optik GmbH

Ettlingen · Germany
Phone +49 (7243) 504-2000
Fax +49 (7243) 504-2050
info@brukeroptics.de

Bruker Optik Asia Pacific Ltd.

Hong Kong
Phone +852 2796-6100
Fax +852 2796-6109
asiapacific@brukeroptics.com.hk