# PicoRaman

## The world's first integrated time-gated Raman spectrometer with real fluorescence rejection

a product based on
**Timegated® Raman technology**

timegate
ahead of time

# What is new in **PicoRaman**?

**The new PicoRaman spectrometer based on Timegated® Raman technology** broadens the application areas and measurement environments even further. PicoRaman spectrometer allows for new applications of Raman spectroscopy in the fields of science and industry where fluorescence emission has previously been problematic for successful Raman analyses.

Measurements of materials and reactions with high thermal emission (i.e. in high temperature processes) or with ambient light are possible with PicoRaman technology. PicoRaman opens up new possibilities for R&D in catalysis, metallurgy, and combustion research, and is in use in proven commercial applications in the chemical and mining industries.

## Advantages

01

Wider **application areas** than ever because of effective fluorescence rejection

02

Wider **operation areas** than ever because thermal emission and ambient light do not interfere the measurement

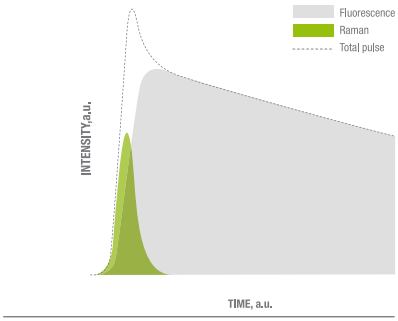
03

**More data** than ever with combined Raman and time resolved fluorescence data

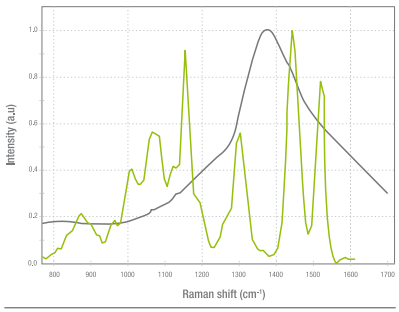
# New Innovation for Raman Analysis

Fluorescence emission is seen as the main challenge in Raman spectroscopy. The patented, new Timegated® technology is developed to solve this issue.

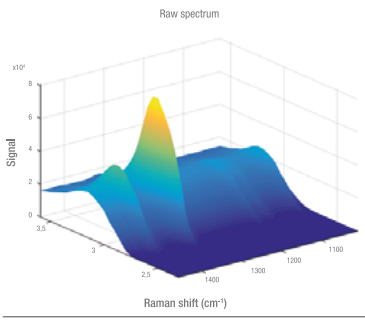

## Technical solution




Raman Scattering and Fluorescence Emission as a function of time




Comparison of conventional and Timegated® Raman spectra of milk




3D image of time gated data

Raman scattering and fluorescence emission phenomena differ in time scale. Raman scattering occurs fast – within sub picoseconds time scale – whereas fluorescence emission has much longer decay times. PicoRaman uses time gating to both differentiate the fluorescence and Raman signals, and additionally gives temporal information on both.

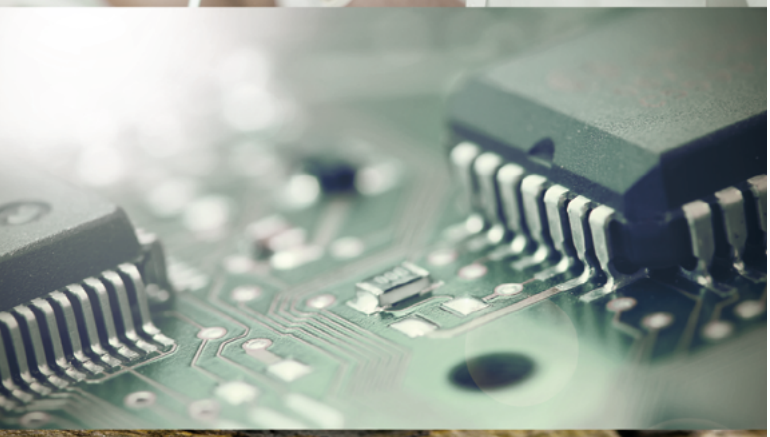
New PicoRaman spectrometer is equipped with 100 picosecond pulsed excitation and time-resolved single-photon counting detector array, enabling effective, real fluorescence rejection from Raman signal and making both quantitative and qualitative Raman spectroscopy analysis more accurate. Spectral analysis becomes more specific and reliable as fluorescence is no longer a disturbance.

In addition to effective fluorescence rejection, Timegated® Raman measurement approach provides a totally new data dimension - time. In addition to spectral wavelength axis, we can now see also how photons occur in time dimension. This brings totally new features and benefits to Raman spectroscopic analyses. In addition to the data of Raman scattering, PicoRaman provides time-resolved information on fluorescence emission decay.

# Fast and Easy Material Characterization with Molecular Fingerprinting

Raman spectroscopy is a very powerful technique for material characterization in wide application areas due to its beneficial features including intrinsically high molecular specificity, the requirement for minimal or no sample pre-treatment, the ability to measure complex (biological) solutions, immunity to high water content, the flexibility of sampling configurations, and suitability for automation. Furthermore, Raman technology has useful properties of being non-destructive, non-contact, label-free, fast and robust way of measurement, making the use of technique very convenient and easy.

## Application areas



## Instrument Specifications

| | |
|---|---|
| **Spectrometer** | |
| Spectral resolution | 5 $cm^{-1}$ |
| Spectral range | -200-2000 $cm^{-1}$ * |
| **Detector** | |
| Detector Type | CMOS SPAD array, single photon counting |
| Pixel amount | 8 x 768 pixels |
| Time resolution | 100 ps |
| **532 nm Picosecond Pulsed Laser** | |
| Spectral line width | < 0.1 nm |
| Pulse width | < 100 ps |
| Pulse energy | SW control to 1 µJ |
| Repetition rate | 50 or 300 kHz |
| Laser power | SW controlled up to 50 or 300 mW at laser port |
| **Physical** | |
| Spectrometer dimensions | 625 mm(W) x 350 mm(D) x 180 mm(H) |
| Weight | 19 kg |
| Operating Conditions | Normal laboratory environment |
| **Sample cube with lab Raman probe** | |
| Convenient and safe measurement of solid, liquid and powder samples | |
| Top and side inlets for the probe | |
| Motorized sample rotation with speed control | |
| Accurate focus adjustment using thumbscrews | |

* The spectrograph does not contain laser blocking filters.

**PicoRaman is fiber coupled spectrometer with FC connectors. Several Raman probe or microscope sampling interfaces available.**

See more technological information from our Web pages.
**www.timegate.com**

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