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Product Release Note

NEW TIME-RESOLVED INVERTED MICROSCOPE MICROTIME 200

The recently released MicroTime 200 fluorescence lifetime microscope system is a powerful, newly developed instrument capable of fluorescence lifetime imaging (FLIM) with optional single molecule detection (SMD) sensitivity. It contains the complete optics and electronics for recording virtually all aspects of the fluorescence dynamics of microscopic samples or femtoliter volumes.

The instrument gains its exceptional sensitivity and flexibility in combination with unprecedented ease of use from a unique fusion of miniaturized and highly sophisticated state-of-the-art optics and electronics. These allow for the first time to run an instrument of comparable complexity and power to be operated in routine work, yet without having to spend more time on instrument maintenance than on original scientific content.

With the MicroTime 200, submicrometer spatial and picosecond time resolution can be achieved. This is ensured by incorporation of high-quality mechanical and optical components. For the benefit of simple, robus, and familiar sample handling, the base of the latest inverse Olympus IX 71 microscope is used. For 2D imaging at submicrometer resolution the system incorporates a piezo scanning stage driven by a high-performance, closed-loop digital position controller from Physik Instruments GmbH. The scan controller, as well as all other components, including shutters and monitoring detectors are seamlessly integrated under the MicroTime software interface. The instrument hardware and software can be configured very flexibly for different user's needs. Various options are available, for example, for 2D or 3D fluorescence lifetime Imaging (FLIM) and confocal detection.

The underlying key technologies are the proven Picosecond Diode Lasers and the Time-Correlated Single Photon Counting (TCSPC) electronics developed by PicoQuant, complemented by state-of-the-art piezo-scanning technology and optics from industry leaders.

For data acquisition the outstanding Time-Correlated Single Photon Counting board TimeHarp 200 is utilized. This highly integrated PCI-plug-in-board provides several measurement modes, out of which one is of pivotal importance for the realization of the MicroTime system: the board's Time-Tagged Time-Resolved (TTTR) measurement mode allows it to perform vastly different measurement tasks based on one single data format, yet without any sacrifice of information available from each single photon. This in turn allows it to handle all measurement data in a standardized and yet flexible way. Based on this clean concept of data handling, the operating software of the MicroTime 200 could be designed with almost unlimited flexibility for integration of virtually all algorithms and methods for the analysis of fluorescence dynamics users may require. At the same time, the system software was designed with data consistency and ease of use as primary design goals. Based on the powerful but generic TTTR data collection, users can perform an unlimited number of analysis steps without losing track of interdependence and origin of their measurement and analysis data. All this is realized through a workspace

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concept, in which the TTTR file is the origin of each measurement. Derived results can be obtained through a vast set of analysis tools, such as intensity time trace, burst analysis, lifetime histogramming, fluorescence correlation spectroscopy (FCS), lifetime imaging. All derived data is maintained in the workspaces, including a log file keeping track of all measurement and analysis steps. For off-line data analysis the MicroTime software can be used separate from the microscope, on a different PC.

Contact:
PicoQuant GmbH
Uwe Ortman
Rudower Chaussee 29
12489 Berlin, GERMANY
Tel.: 149-30-6392 6560
Fax: 149-30-6392 6561
Email: photonics@pq.fta-berlin.de
Web: www.plcoquant.com