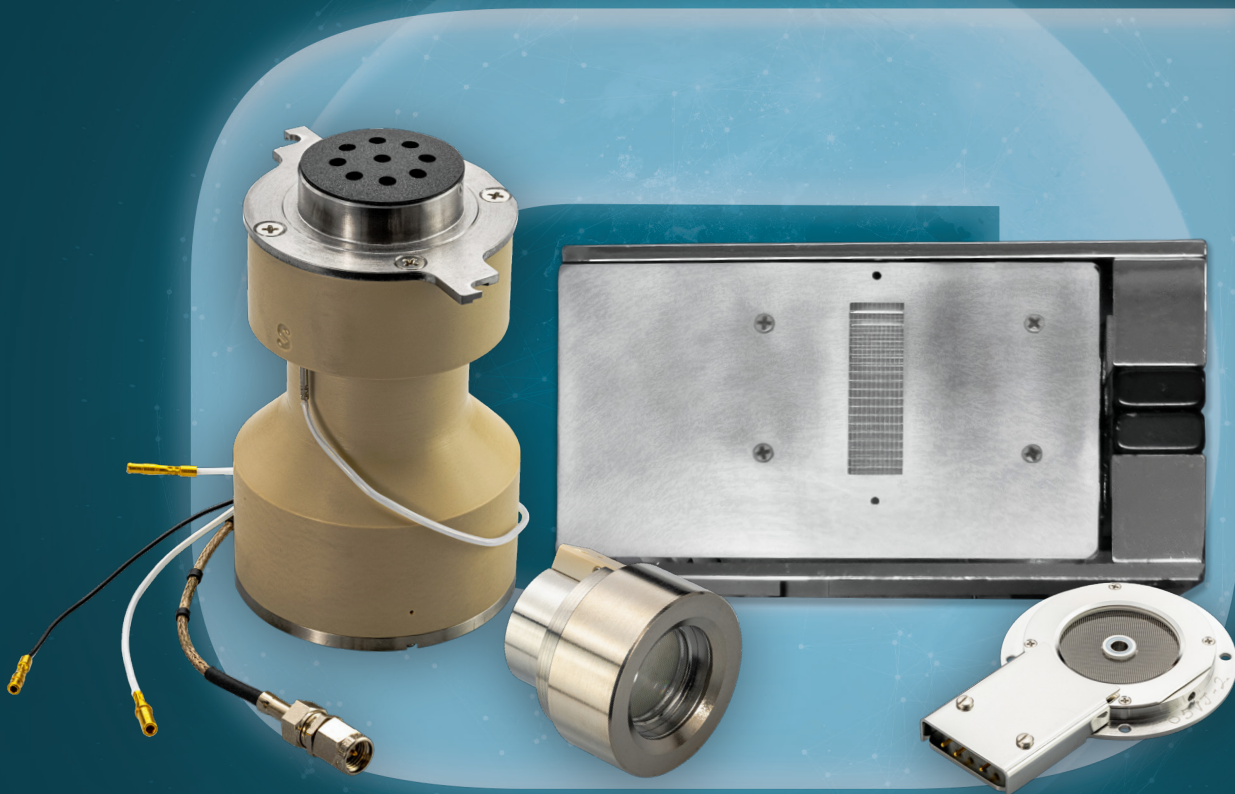


Time-of-Flight[®]

DETECTION TECHNOLOGY



**MARKET-LEADING
TOF DETECTION TECHNOLOGY PLATFORMS**



Photonis is the leader in Time-of-Flight (TOF) detection technology for Mass Spectrometry. Based on a range of technology platforms, we provide unique and customized solutions. Through partnership and innovation, we optimize design, enabling you to achieve your goals.

PHOTONIS TIME OF FLIGHT DETECTORS TOTAL PROCESS CONTROL, LONGEVITY, ROBUSTNESS, AND PERFORMANCE

With over 50 years of experience in mass detection technology, we concentrate on creating the right detector for your mass spectrometry needs.

Photonis leverages a range of advanced technology platforms, including our revolutionary Bipolar TOF (BPTOF), ultrafast Advanced Performance TOF (APTOF), and long-life MTOF detectors, to cater to the precise needs of mass spectrometry detection. Our commitment to excellence extends beyond just designing detectors; we prioritize manufacturing them with the highest quality standards in mind.

Our state-of-the-art facility utilizes modular building blocks and maintains strict control over the entire manufacturing process, from hand-crafting our own specialized glass to producing cutting-edge ScintiFast™ components and designing the electronics and Microchannel Plates. By

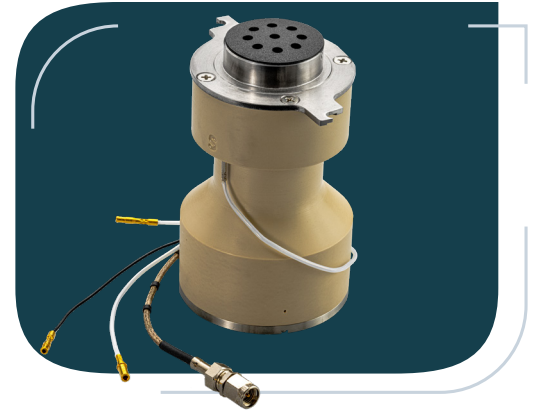
overseeing every step of production, we ensure that our detectors offer unrivaled quality, reproducibility, and performance, resulting in the most durable detectors available on the market.

This holistic approach allows us to tailor TOF detector attributes to meet your specific technological requirements, whether that involves enhancing lifetime, sensitivity, or dynamic range. Our adherence to ISO9001 certified practices, combined with rigorous quality control measures and continuous improvement programs such as Lean Manufacturing, 6 Sigma, Quick Response Manufacturing (QRM), and Planning Control, guarantee exceptional quality at every stage of the manufacturing process.

MICROCHANNEL PLATE-BASED TOF DETECTION

BPTOF DETECTION BIPOLAR TIME OF FLIGHT

Photonis' patented flagship Bipolar TOF Detection is an optically coupled platform that provides unmatched performance and operational lifetime, while providing a cost savings to the customer.



MICROCHANNEL PLATES (MCP)

- ◆ Configurations can be optimized to suit virtually any application, including special coatings
- ◆ Longest lifetime, stable operation detectors via proprietary L3N glass
- ◆ Smallest commercially available pore size (2 μ m) producing an inherently fast detector
- ◆ Large ion detection areas and very slim overall profile, allowing compact instrument designs
- ◆ MCP sets can be customized for speed, dynamic range, and operational lifetime

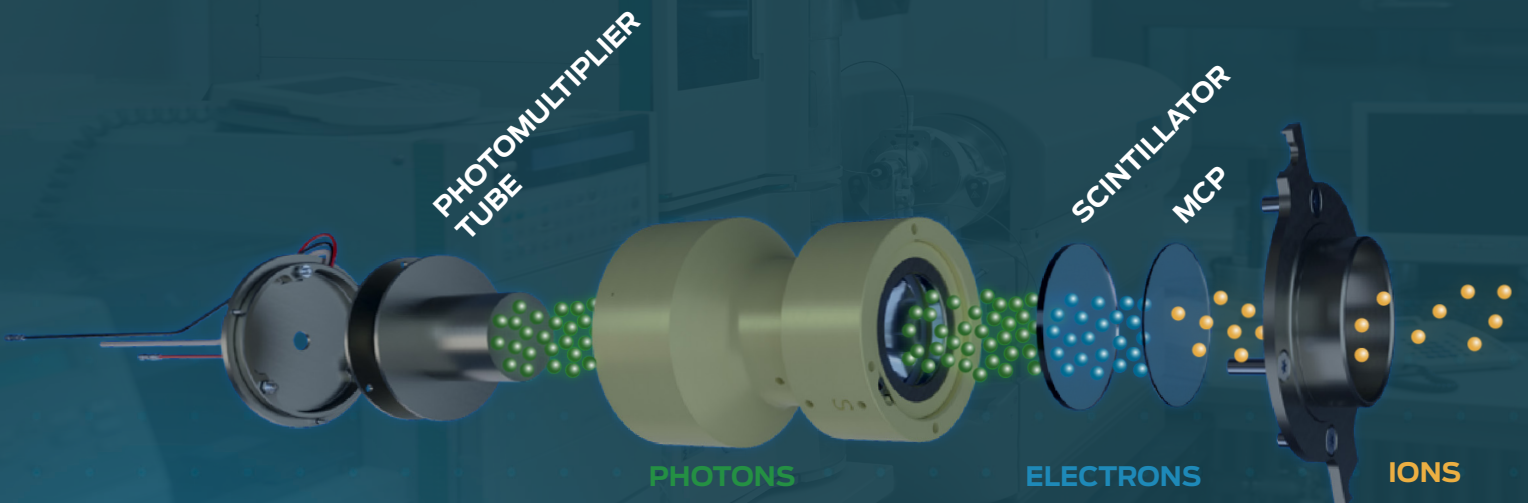
SCINTILLATOR

- ◆ At the core of the BPTOF detector is the scintillator
- ◆ Producing a fast flash of light, enabling worry-free optical coupling and high voltage isolation
- ◆ Two scintillator variants, optimized for either:
 - ScintiFast™ (<500ps decay time)
 - Operational lifetime (1000ps decay time)

PHOTOMULTIPLIER TUBE (PMT)

- ◆ BPTOF uses PMT for ion detection
- ◆ Two PMT options:
 - World's fastest performing PMT (FWHM ~400ps)
 - High peak output linearity (>2V) with a slower time response (1.2ns)
- ◆ Optical coupling allows up to 20kV voltage standoff and protects detection electronics

BPTOF OPERATION PRINCIPLE

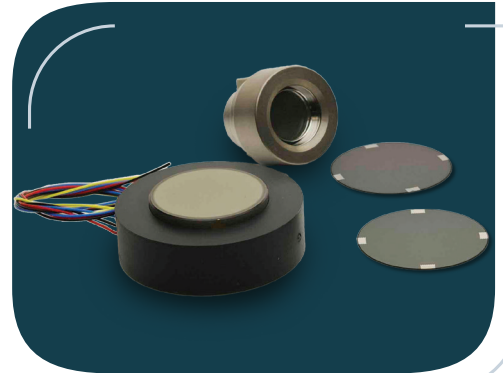


MICROCHANNEL PLATE-BASED TOF DETECTION

APTOF DETECTION

ADVANCED PERFORMANCE TIME OF FLIGHT

The APTOF (Advanced Performance Time of Flight Detectors) is Photonis's fastest detection platform consisting of two (chevron) or three (Z-stack) Microchannel Plates.



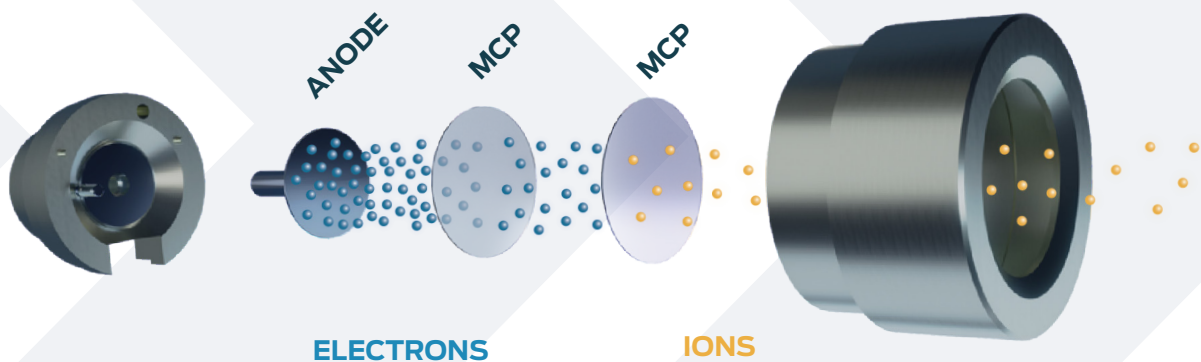
FEATURES

- ◆ TOF Detector platform equipped with Microchannel Plates (MCPs), anode, with optional capacitive high-voltage coupling
- ◆ MCP cartridge designs for easy handling and integration
- ◆ Extended dynamic range (EDR) MCPs for increased linear output
- ◆ Photonis has produced hundreds of custom designs with differing input areas and shapes, mounting schemes, and overall geometric requirements — all with our commitment to lifetime and serviceability at their heart

BENEFITS

- ◆ Fastest timing
- ◆ Low noise / background
- ◆ Flexible detector geometry / size
- ◆ Optional straightforward implementation with single HV supply
- ◆ Can be implemented with position-sensitive designs
- ◆ Insensitive to visible light

APTOF OPERATION PRINCIPLE



MAGENTIC FIELD-BASED TOF DETECTION

MTOF™ DETECTION MAGNETIC TIME OF FLIGHT

Magnetic Time of Flight (MTOF) detection platform provides a unique combination of response time, gain stability, dynamic range and lifetime, bringing your mass spectrometer to the next level.

FLAT CONVERTER

Provides nearly 100% detection efficiency

ExB FIELD

Reduces jitter by uniform transition of secondary electrons to scintillator

ScintiFast™

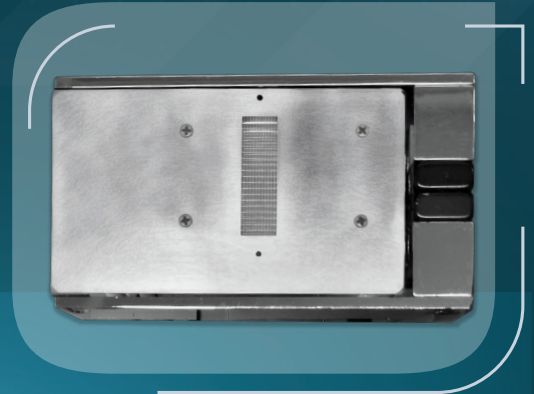
The fastest available inorganic scintillator enables shorter response time and enhances detector lifetime

OPTICAL DECOUPLING

Provides low voltage output signal and enables easy bi-polar detection

SELECTED PHOTON SENSOR

Photon sensor is selected to meet desired specifications response time and dynamic range.

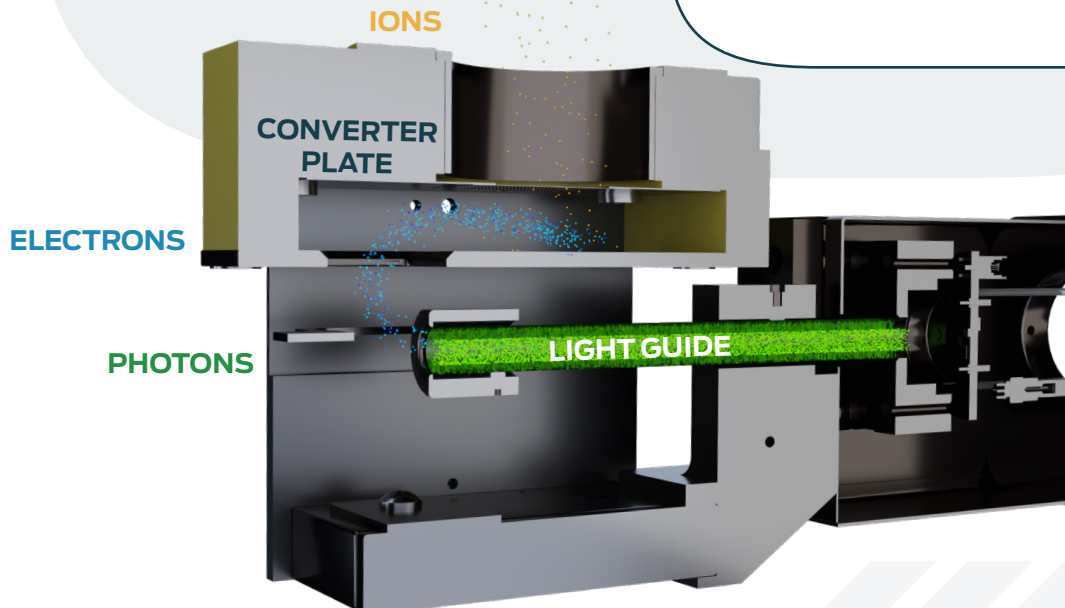


EXPOSE EVERY DETAIL WITH PHOTONIS

The MTOF™ technology platform is an advanced solution for Time of Flight Mass Spectrometers, suitable for detection of a very wide range of ion mass.

MTOF™ detectors are flexible in design. Each detector is developed to meet the requirements of a specific system and application, creating customer satisfaction through performance.

MTOF OPERATION PRINCIPLE



LEADING YOU TO PEAK PERFORMANCE

PHOTONIS
EXOSSENS GROUP



exosens.com | science@exosens.com |    

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