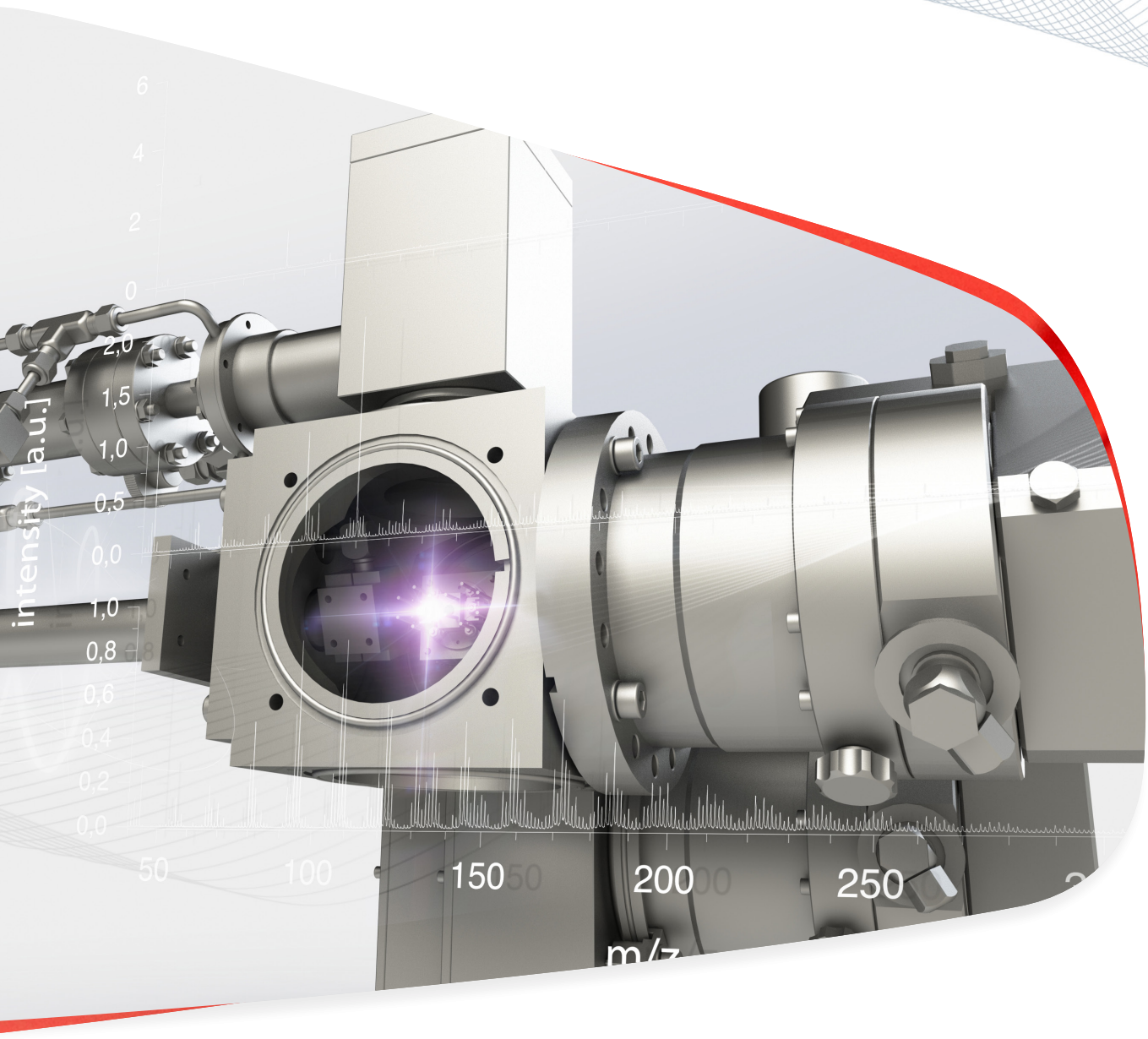
photonion



Product Description

Photon**LIZA** single particle profiler

LASER IONIZATION AEROSOL MASS SPECTROMETER

Single-particle deep profiling by advanced laser ionization MS

PhotonLIZA

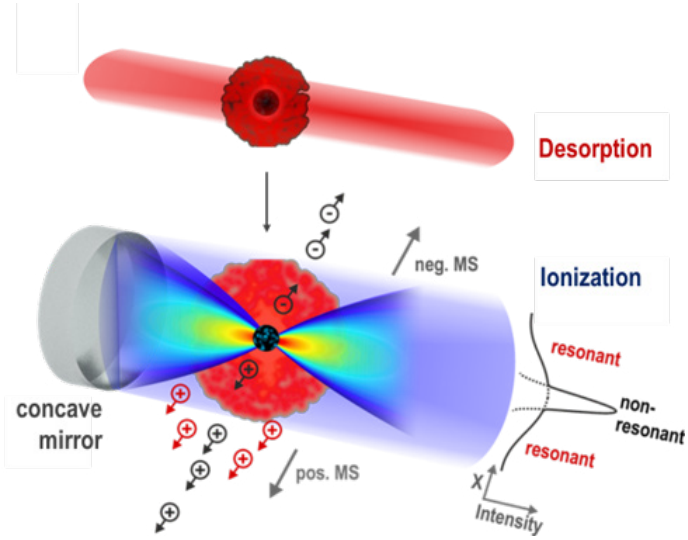
single particle profiler

CHEMICAL SPECIATION OF INDIVIDUAL PARTICLES BY TAILORED LASER EXCITATION - A DEEP VIEW INTO COMPLEX AEROSOLS

Photonion GmbH has developed a unique single particle aerosol mass spectrometer, combining three ionization processes in a novel, patented laser excitation scheme.[1,2]

It is the only real-time system detecting all key compounds for climate and health effects, including transition metals and carcinogenic polycyclic aromatic hydrocarbons (PAH).

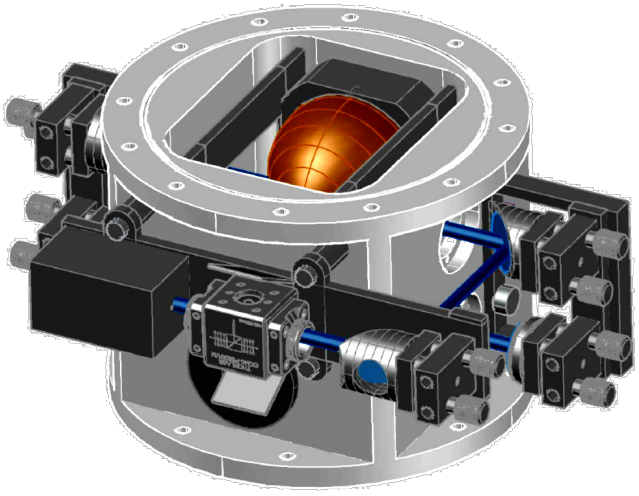
Photonion provides customized modular PhotonLIZA single particle profiler systems as well as scientific and technological assistance. We open new avenues for environmental monitoring, risk assessment and in-depth atmospheric science[3].



Patented laser ionization scheme for organic and inorganic compounds[1]

METHOD

The system acquires bipolar mass spectra and the size from individual particles. Tailored laser pulses feature resonance-enhanced ionization of both aromatic hydrocarbons and transition metals[1]. Also single-, ultra-fine particles can be analyzed by combining a new optical design, ultra high-repetition lasers and a modulated ion transmission.



Novel single particle detection and sizing unit

1 Schade et al., Anal. Chem. 2019, 91,15
2 Passig et al., Anal. Chem. 2017, 89,12
3 Li et al., Atmos. Chem. Phys., 2019, 19,139-163

SPECIFICATIONS AND OPTIONS

Basic System

for bipolar Laser Desorption/ Ionization (LDI) single particle mass spectrometry

- Standard particle size range 180 - 2500 nm (other options on request)
- Special 248 nm (KrF) or 193 nm (ArF) PhotonEX excimer laser
- Bipolar Reflectron TOF-MS mass range 10...2000 m/z, resolution ~1500 m/Δm
- Dynamic range >10^5
- Inlet flow volume 100 std. mL/min
- Up to 100Hz mass spectral sampling rate
- Data acquisition software included

PAH Option

Multi-step-laser excitation for add-on Polycyclic Aromatic Hydrocarbon detection

- Patented back-reflection/multi-step laser excitation for additional detection of toxic Polycyclic Aromatic Hydrocarbons (PAH, requires 248 nm PhotonEX excimer laser)
- Additional CO_2-desorption laser
- Unique single particle detection of aromatic molecules (PAH) combined with bipolar LDI
- Modulated ion transmission for enhanced dynamic range >10^7

UFP Option

(Ultra Fine Particle detection)

- Size range 30-2500 nm, free-running below 200 nm
- 1 kHz free running rate at 248 nm or 193 nm
- Patented multiplexing of active and free triggering for simultaneous UFP and standard particle size modes
- Data reduction acquisition mode

Source Tracking Option

Detection of transient signals, e.g. from ships

- Aerosol enrichment unit
- 1 kHz spectra sampling rate, 248 nm
- Automated switching to high-repetition mode for specified events
- AIS receiver/tracker and air trajectory modelling package

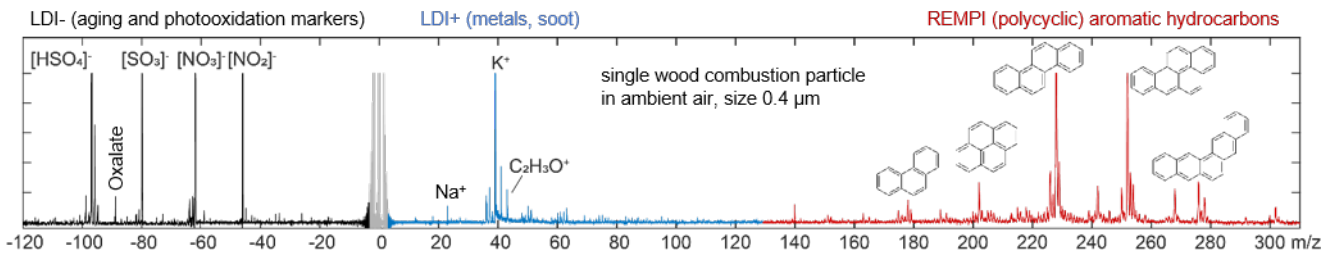
Tunable Laser Option

- Optical Parametric Oscillator for 210...2400 nm
- 10 Hz spectra sampling rate
- Patented, active triggering system

Dose Option

(Cell exposure dose monitoring)

- In conjunction with Vitrocell Exposure Station™ Air-Liquid Interface cell exposure technology
- Monitors particles at the cell deposition position



Application examples

Atmospheric monitoring and source apportionment of aerosols (e.g. power plants, industrial combustion, engine exhaust)

- Long-range surveillance of ship emissions
- Safety and health relevant aerosols
- Enhanced trace detection of transition metals
- Process monitoring

PhotonLIZA

LASER IONIZATION AEROSOL MASS SPECTROMETER

photonion

PHOTONION GmbH
Hagenower Str. 73
19061 Schwerin
Deutschland / Germany

T (+49 385) 3993 288
F (+49 385) 3993 281
E info@photonion.de
W www.photonion.de