

High Precision Excimer Lasers

ATL
ATL

Micromachining
Spectroscopy
Medicine
FBG

for a wide range of applications



...up to 1kHz!



ATL Lasertechnik GmbH
Advanced Technology Lasers

ATLEX Innovative Technology Lasers

Background

In 1993 **ATL LASERTECHNIK** recognized that expanding the range of applications for coherent UV radiation in science, medicine and industry required a new generation of excimer lasers to fill the technology gap between large, conventional UV laser sources such as excimer lasers (moderate rep. rates, hundreds of millijoules) and rfi-excited UV sources (high rep. rates, micro-joules). This technology gap is particularly apparent in applications requiring deep UV laser radiation (248 nm, 193 nm and 157 nm) beyond the current range of diode-pumped solid-state sources.

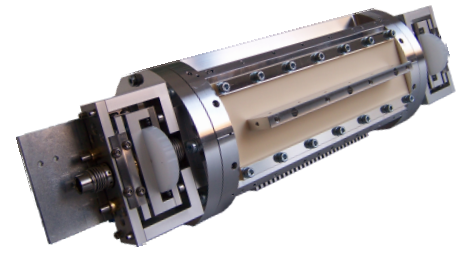
This gap has now been filled by **ATL Lasertechnik** with a new range of powerful air cooled excimer lasers based upon metal-ceramic technology.

ATLEX Concept

The **ATLEX** series of short pulse excimer lasers employs state of the art metal-ceramic technology and creates powerful new concepts in equipment and design of the discharge process. ATL's corona preionization scheme provides highly efficient laser performance with pulse duration of a few nanoseconds and enhanced reliability of all high voltage components. The key features of **ATLEX** laser design are:

- **Solid State Switch**
- **Corona Preionization**
- **Laser Head Volume < 3 l**
- **Total-Metal-Ceramic Tube**
- **Air-Cooled up to 1 kHz, Thermal Management**
- **RS485, RS232, USB and FOC Interface**
- **Energy Stabilization Mode**
- **Handheld Contr. (optional)**
- **Integrated Pump & Halogen Filter**
- **Meets European CE Standard**

The unique ATLEX laser design results in a rectangular-shaped beam of unsurpassed homogeneity (see profile), unlike competing small lasers with more Gaussian profile, often also described as excellent but far less useful for materials processing including medical applications.

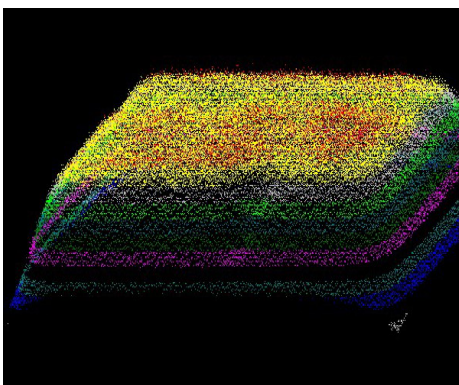


ATLEX-I chamber

Metal Ceramic Tube

The **ATLEX** metal-ceramic laser tube is entirely manufactured of halogen and UV-resistant aluminium alloy and ceramics. A considerable lower rate of gas contamination, long static gas lifetime and improved electrical reliability are guaranteed by the use of metal seals and ceramic insulated high voltage feed-throughs. Additionally, an internal electrostatic dust purifier - depressing window contamination - is provided as a standard.

The **ATLEX** vessel geometry provides symmetrical cooling resulting in an excellent beam quality and beam pointing stability.



ATLEX, 248nm beam profile, far field



Solid state switch

Corona - Preionization

- Excellent beam quality
- Low beam divergence
- Excellent pointing stability
- Low thermal drift
- Reduced high voltage
- Enhanced gas lifetime
- Extended optics cleaning and chamber service intervals

Flushable Optics Holder

Purging the entire beam path from the output coupler of the laser to the desired location with inert gas is a well established practice in the UV laser industry.

The major beneficial purging effects are a reduction of the present oxygen, UV light generated ozone, water vapor and outgassed contamination levels in the beam path. Oxygen and other contaminations strongly absorb the UV radiation, generating ozone and excited contaminants which attack optical coatings. Purging therefore results in a higher transmission of the UV light, and prolonged useful life of the exposed optical elements.

Applications

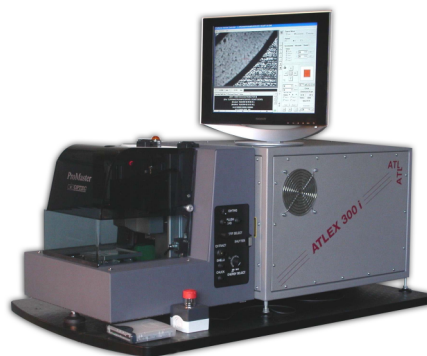
ATLEX lasers are designed for numerous applications in medicine (eye surgery), micro-electronic industry (e.g. fiber Bragg grating writing) and science where a very high precision processing and high reliability of laser technology are required.

- Fiber Bragg Grating
ATLEX-FBG 193 nm and 248 nm generates short pulses with a spatial coherence compatible for all types of fiber Bragg grating writing.



*Micromachining System based on ATLEX-S-193 nm Short Pulse Excimer Laser
(Courtesy of FZK, Karlsruhe)*

- Micromachining
Very short excimer laser pulses of 10 - 20 mJ with equivalent Megawatt peak power are used in rapid prototyping, micro-machining systems for processing micro-electronic and bio-medical components in materials like polymers, inorganics (glass), thin metals, plastics and ceramics.



*ProMaster turnkey workstation (based on ATLEX) sets a new standard in micromachining
(Courtesy of OPTEC S.A)*

- Spectroscopy
Short pulses of few nanoseconds provides researchers a new powerful UV tool for photo-ionisation processes and high resolution TOF spectroscopy. Extreme short ATLEX laser pulses (<4ns) are also used by various analytical tools e.g. excimer laser high-fluence ablation systems in connection to LA-ICP/ICP-MS - spectroscopy.

- APLI
APLI (Atmospheric Pressure Laser Ionization) is a breaking ionization method with unrivalled sensitivity and selectivity for demanding applications such as the determination of PAH at low concentrations, polymer research, etc..



*APLI source coupled to a microTOF II™
(Courtesy of Bruker Daltonics™)*

- Refractive Surgery
The randomized flying spot method combined with a fractal projection technique sets a new standard in wave front - assisted refractive surgery for a wide range of myopia, hyperopia and astigmatism as well as corneal irregularity corrections.

The ATLEX Series Excimer Laser

ATLEX-I

A new generation of compact air-cooled, high repetition rate excimer lasers, designed for low- and mid-range duty cycle applications.

Applications

- Micromachining
- Laser ablation
- Spectroscopy
- Medicine



Key Features:

- High Repetition Rate up to 1kHz
- TMC (Total-Metal-Ceramic) Vessel
- Solid State Switch
- Integrated 4-Valve System
- Integrated Pump & Halogen Filter
- Laser Head Volume < 3 l
- Air-Cooling, optional Liquid Cooling
- Flushable Optics Holder
- Energy Stabilization Unit
- RS485/232, USB & FOC Interface
- CE and RoHS Compliant

ATLEX-FBG

Compact, high efficient excimer laser designed and optimized for Fiber Bragg Grating (FBG) writing.

Application

- Fiber Bragg grating writing



Key Features:

- Spatial Coherence >300µm
- TMC (Total-Metal-Ceramic) Vessel
- Solid State Switch
- Integrated 4-Valve System
- Integrated Pump & Halogen Filter
- Laser head volume < 3 l
- Air-Cooling, optional Liquid Cooling
- Flushable Optics Holder
- Energy Stabilization Unit
- RS485/232, USB & FOC Interface
- CE and RoHS Compliant

ATLEX-L

Industrial excimer laser for high duty applications.

Applications

- Micromachining
- Medicine
- Analytical systems



Key Features:

- TMC (Total-Metal-Ceramic) Vessel
- Solid State Switch
- Extended Dynamic Gas Lifetime
- Extended Static Gas Lifetime
- Laser Head Volume 6 l
- Air-Cooling, optional Liquid Cooling
- Flushable Optics Holder
- Integrated 4-Valve System
- Modular Design / Service Friendly
- RS485, RS232, USB and FOC
- CE and RoHS Compliant

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