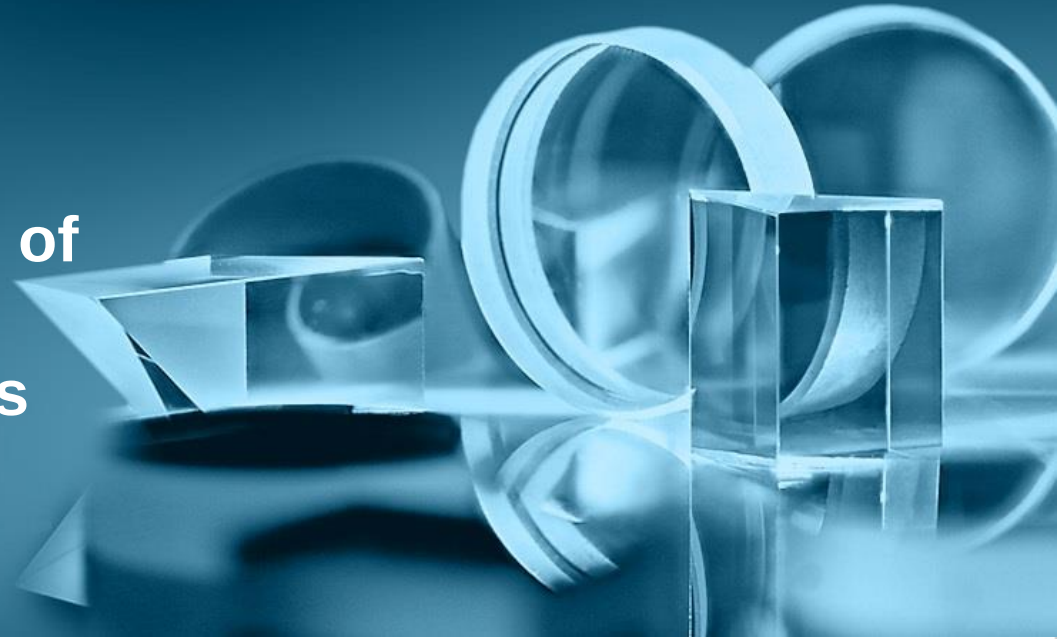


Manufacturing capabilities of laser optical, crystal and electro-optical components

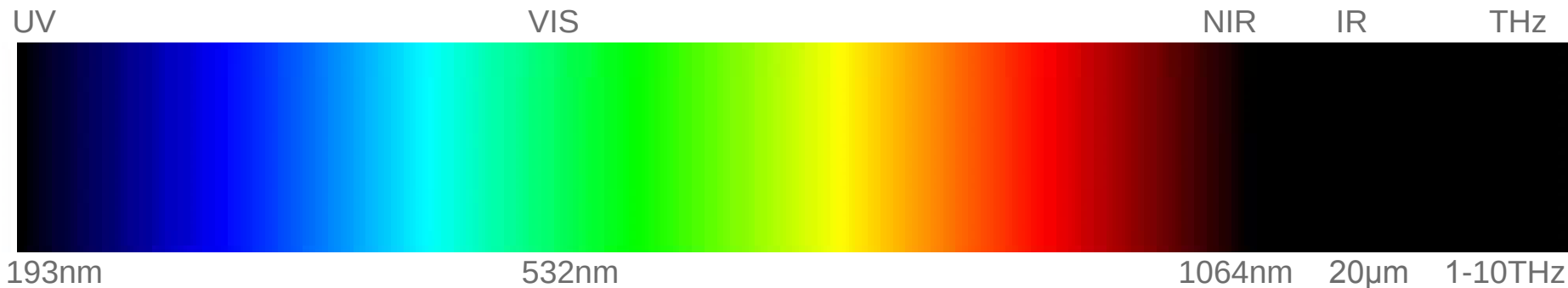


EKSMA Optics mission

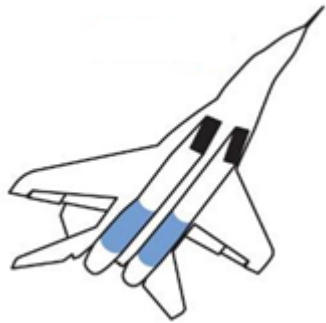
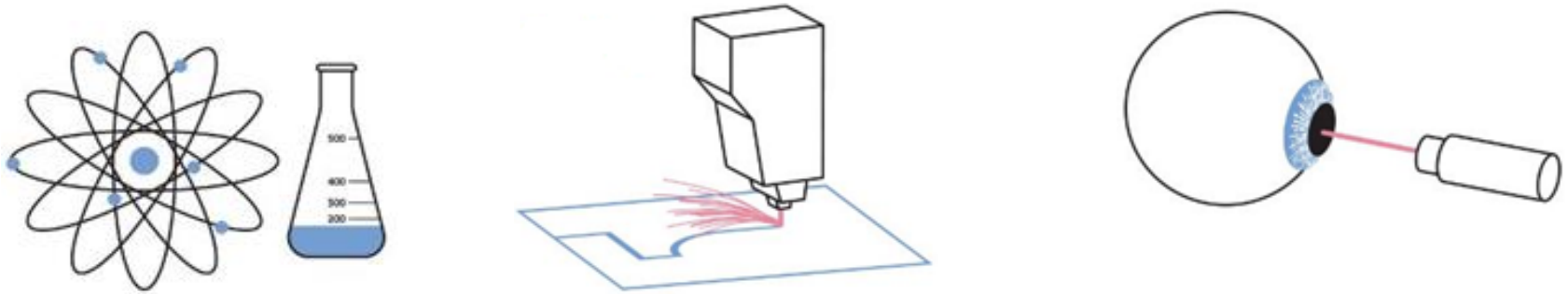
EKSMA Optics is a manufacturer and global supplier of **reliable laser components** for high-power **lasers, laser systems**, and other **optical instruments** manufacturers and end-users.

We help our customers to solve their technical problems and complete their tasks providing a wide range of **standard laser components**, as well as offering **customized components** tailored to particular customer needs.

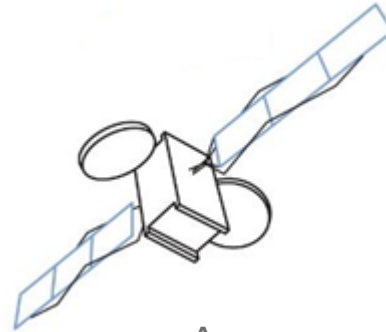
Our components are used for applications starting from 193 nm up to 20 μm and at the 1-10 THz range.



Markets



Defence



Aerospace

Products: Optical components

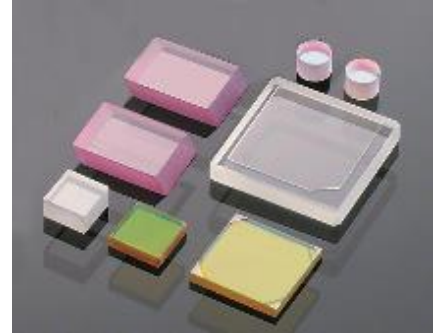
- ▶ Laser coatings (IBS, E-beam, IAD, MS)
- ▶ Laser mirrors (HR, PR, BB, Low GDD)
- ▶ Lenses (spherical, aspherical, cylinder, axicon)
- ▶ Filters (Notch, UV, color glass, neutral density)
- ▶ Windows (curved, flat, elliptical, precision, flats)
- ▶ Polarizing optics (TFPs, waveplates, prisms)
- ▶ UV & IR optics



Materials: Schott, Heraeus, Corning, Ohara glasses and Fused Silica, Natural Quartz, Calcite, LiF, MgF_2 , CaF_2 , BaF_2 , ZnSe, Sapphire, Si, Ge.

Products: *FemtoLine* optics and crystals

- ▶ Ultrafast low GDD mirrors
- ▶ Ultrafast polarizing optics
- ▶ Thin lenses
- ▶ Broadband low GDD coatings
- ▶ Variable attenuators for femtosecond pulses
- ▶ GVD compensation plates
- ▶ Frequency conversion crystals for fsec Ti:Sapphire and Yb:KGW lasers
- ▶ Femtokits for THG of fsec Ti:Sapphire lasers



Products: ***Nd:YAG LaserLine*** optics and crystals

- ▶ Nd:YAG rods and slabs
- ▶ Harmonic nonlinear crystals – LBO, BBO, KTP, DKDP, KDP
- ▶ Nd:YAG Laser mirrors
- ▶ Output couplers
- ▶ Rear mirrors
- ▶ Harmonic separators
- ▶ Lenses
- ▶ Polarizing optics
- ▶ Variable attenuators



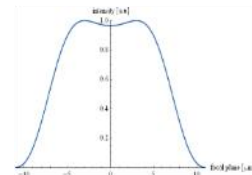
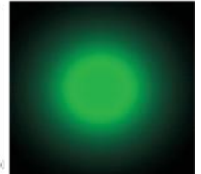
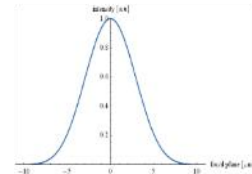
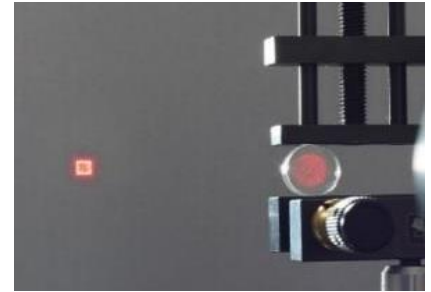
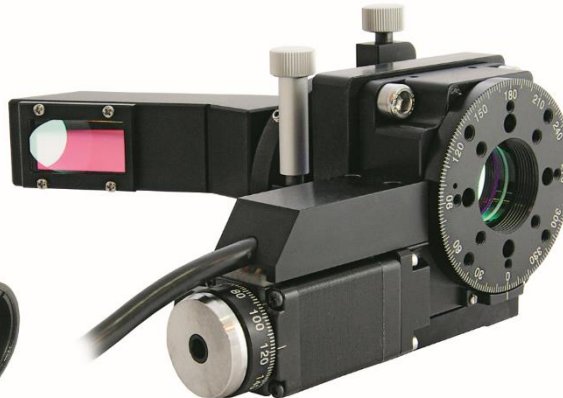
Products: Nonlinear and Laser crystals

- ▶ Frequency conversion crystals for applications in UV, VIS, NIR applications – LBO, BBO, KTP, KTA, DKDP, KDP, LiNbO₃, MgO:LiNbO₃, LiIO₃
- ▶ NIR, MIR and IR frequency conversion crystals – AgGaSe₂, AgGaS₂, GaSe, ZnGeP₂, etc. ...
- ▶ THz generation crystals – GaSe, ZnTe
- ▶ Raman shift crystals – KGW, Ba(NO₃)₂, BaWO₄, SrWO₄, SrMoO₄
- ▶ Laser crystals – Yb:KYW, Yb:KGW, Yb:YAG, Nd:YAG, Nd:YVO₄, Nd:YLF, Nd:KGW, Ti:Sapphire
- ▶ Passive Q-switching crystals – Cr:YAG, Co:Spinel



Products: Optical systems

- ▶ Beam Expanders
- ▶ F-Theta Lenses
- ▶ Beam shaping lenses for micromachining
- ▶ Variable Attenuators for Linearly Polarized Laser Pulses
- ▶ Motorized attenuators



Products: Opto-mechanical components

- ▶ Optical Tables and vibration isolation systems
- ▶ Brackets & Rails
- ▶ Base mounts & Accessories
- ▶ Optical Mounts
- ▶ Optical Positioners
- ▶ Translation & Rotation Stages
- ▶ Adjustment Screws
- ▶ Motorized Positioners



Products: Electro-optics and laser electronics

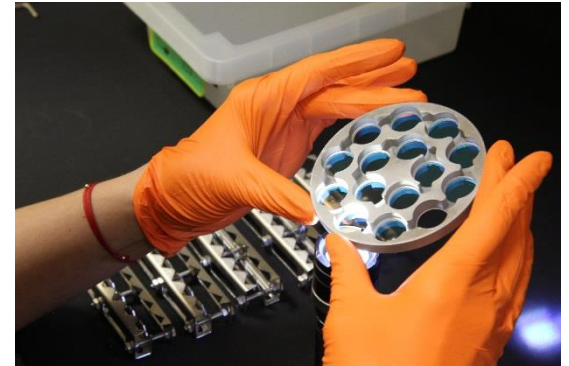
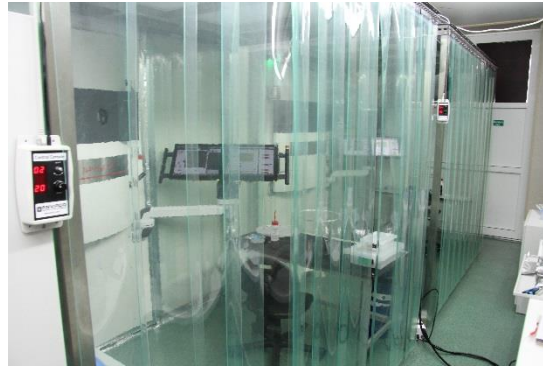
- ▶ Pockels cells: BBO, DKDP, KTP and RTP based;
- ▶ Electro-optical crystals without housing: BBO, DKDP, LiNbO_3
- ▶ Drivers and power supplies for Pockels cells;
- ▶ Synchronization modules for lasers – SY4000;
- ▶ Ultrafast pulse picking systems based on electro-optics;
- ▶ Laser diode drivers – uniLDD;
- ▶ Heaters and ovens with thermo-controllers for nonlinear crystals;



Manufacturing technologies - IBS coatings

EKSMA Optics deposits HR, PR, AR, filter and polarizing coatings in 3 IBS coating machines on different optical glasses and fused silica and AR coatings for nonlinear LBO, BBO and KTP crystals.

Infrastructure of coating facility has three automatic ultrasonic cleaning machines with multi baths, special work places in clean rooms in laminars for opticians and thermal annealing equipment for further treatment of coated optics. Work places are equipped with tools and microscopes for preparation and inspection of surfaces of optical elements.



20 and 30 cm diameter IBS coating chambers

Manufacturing technologies - crystals polishing

Polishing of nonlinear and electro-optical crystals:

- ▶ DKDP, KDP, LiNbO_3
- ▶ LBO, BBO, KTP
- ▶ ZnGeP_2 , AgGaSe_2

flatness $\lambda/8$, polishing quality better than 10/5 scr/dig



Manufacturing technologies - flat optics production

Production of flat optics substrates with 0.5 - 2 inch diameter:

- ▶ N-BK7 and other glasses
- ▶ Fused Silica, Infrasil, Suprasil

flatness $\lambda/10$, parallelism 10 arcsec, polishing quality 20/10 scr/dig



Manufacturing technologies - CNC lens polishing

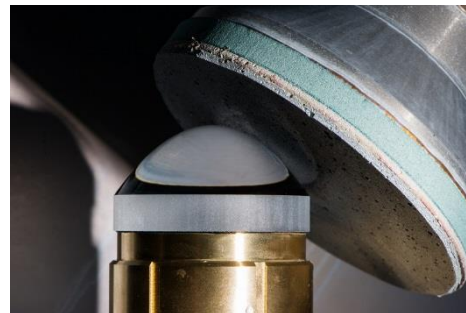
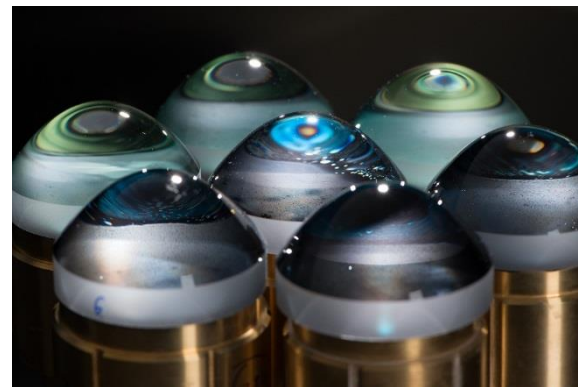
Design, grinding and polishing of 6 to 120 mm diameter:

- ▶ Spherical lenses
- ▶ Aspherical lenses

Standard production from: N-BK7, Fused Silica, S-LAH64.
Other glasses and types of synthetic quartz on request.

- ▶ Precision grade UVFS axicons (conical lenses)

Apex up to $179.5^\circ \pm 3'$, tip rounding $\text{dia} < 0.8\text{mm}$, surface irregularity $< \lambda/4 @ 633\text{nm}$.

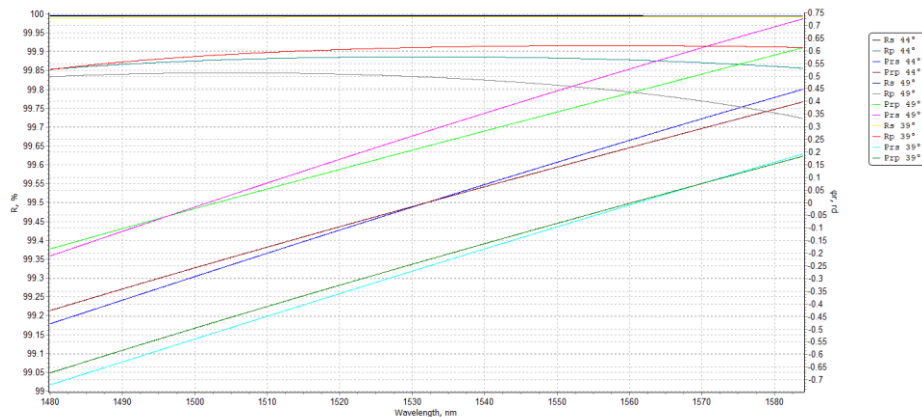
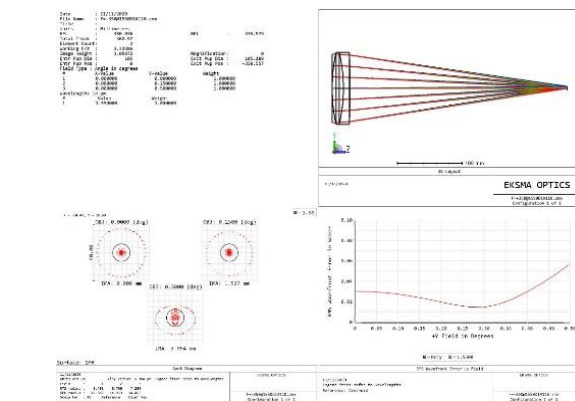


Design and services

Design of optical components
or optical systems with
ZEMAX

Design of most demanding
IBS coatings

Design of opto-mechanical
with SOLIDWORKS



Clean room assembling facilities

The clean room facilities dedicated for assembling of Pockels cells and optical systems are equipped with workspaces in additional laminars. The temperature, humidity and air pressure is controlled and monitored 24/7. Clean room facilities corresponds to ISO 7 class requirements and laminar workspaces to ISO 5 class requirements.



Quality control

All components provided by the Company are subject to quality testing and certifications in quality control laboratories.

Our quality control laboratories are equipped with high-precision optical and laser instruments to perform a variety of measurements and tests of optical laser components.



Quality management

EKSMA OPTICS is ISO 9001:2015 certified company

Certification cycle start date: 19 September 2018

Certificate expiration date: 18 September 2021

Original certification date: 19 September 2012

Certification body: Bureau Veritas

Certificate No: LT2225Q



We deliver reliable high quality

- nonlinear & laser crystals
- laser optics
- laser electronics
- electro-optical components

for high power laser applications!



www.eksmaoptics.com

