SPACE POLARIZER

codixx
colorPol® polarizers

STABLE POLARIZATION CONTROL FOR SPACEBORNE OPTICAL SYSTEMS

Polarization reveals information that intensity measurements alone cannot provide. Spaceborne imaging and remote-sensing instruments use polarizers to establish a defined reference, select a polarization component, or analyze light after a modulator. The optical element must fit the instrument's performance budget and remain suitable throughout launch and operation.

colorPol® glass polarizers from codixx combine a compact optical format with customizable spectral performance, geometry, and polarization-axis orientation. Their glass platform gives developers a design route for demanding optical assemblies.

THE INTEGRATION CHALLENGE

A suitable polarizer must meet more than a contrast specification. Transmission, axis alignment, wavefront quality, and angular response all affect the measurement. Temperature changes, radiation, vacuum, and mechanical loads must also be considered in the final assembly.

- Maintain the required transmission and contrast across the operating wavelength band and incident angles.
- Align the polarization axis to a defined mechanical datum and control optical tolerances.
- Evaluate the polarizer together with coatings, lamination, adhesives, and the mount.
- Define environmental tests and acceptance criteria for the delivered configuration.

The key is to connect component selection to the instrument's optical and environmental requirements. A robust glass element supports this process, while the qualification evidence must cover the actual assembly.

colorPol®
VIS 600 BC5

IN PRACTICE

How codixx polarizers support spaceborne optical systems:

- **Defined polarization analysis:** A fixed linear analyzer converts changes introduced by a modulator into detector intensity differences. Published space-instrument designs illustrate this principle. [2]
- **Optical precision:** Lamination and polishing can improve optical geometry and handling. Published general data include transmitted wavefront distortion below λ/4 at 633 nm over a 10 mm diameter and beam deviation below 1 arc minute.
- **Design freedom:** Custom dimensions, axis orientations, and patterned regions allow the optic to be adapted to the system layout.
- **Relevant test evidence:** An INTA program demonstrates the breadth of environmental testing for polarization optics, including thermal vacuum, vibration, shock, outgassing, UV, gamma, and proton exposure. [1]

WHY DEVELOPERS CHOOSE US

PRECISE POLARIZATION CONTROL
Meet your instrument's optical requirements with tailored transmission, contrast, and axis orientation. colorPol® glass polarizers provide wavelength-specific options across UV, visible, and infrared bands.[1]

COMPACT OPTICAL INTEGRATION
Simplify integration with custom shapes and dimensions that fit your available space. Lamination and polishing help meet wavefront and beam-deviation requirements. [1]

ROBUST GLASS PLATFORM
Build on a durable glass platform with resistance to UV exposure and many chemicals. Mission-specific qualification addresses the complete assembly, including coatings, adhesives, and mounting components.[1]

DESIGN FLEXIBILITY
Realize your intended optical layout with customized polarizers. Patterned colorPol® elements combine multiple polarization axes or spectral regions in one optic, helping reduce component count and integration complexity. [1]

QUALIFICATION WITH A DEFINED SCOPE
Published LCVR tests provide context for qualification planning under simulated space conditions. A similar polarizer qualification approach was proposed; individual codixx polarizer test results were not published. The Metis instrument was launched aboard Solar Orbiter in 2020 and has been conducting scientific observations since November 2021. [2]

With colorPol®, developers gain precise polarization control, greater design freedom, and simpler integration for demanding spaceborne optical systems.

codixx AG
Innovation in Glass – Reliability & Quality

We develop and produce high-precision, customized polarizers and substrates that set new standards. Our products stand for the highest quality, long-lasting performance, and reliable availability.

Manufactured in Germany and supported by stable supply chains, we offer our customers maximum planning security and reliability – even for demanding applications.

REFERENCES
[1] Álvarez-Herrero, A. Polarization Modulators based on Liquid Crystal Variable Retarders for Space Instrumentation. PT&T, March 2014, slides 11–17 and 26–27. polarisation.eu/projectdir/PTT2014_AAH.pdf.
[2] Fineschi, S., et al. Optical design of the multi-wavelength imaging coronagraph Metis for the Solar Orbiter mission. Experimental Astronomy (2020). DOI: 10.1007/s10686-020-09662-z.
[3] Liberatore, A., et al. In-flight validation of the Metis visible-light polarimeter coronagraph on board Solar Orbiter. A&A 672, A14 (2023). DOI: 10.1051/0004-6361/202244069.
[4] European Space Agency (ESA), "Solar Orbiter." [Online]. Available: https://www.esa.int/Science_Exploration/Space_Science/Solar_Orbiter.

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