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## XUV Phase Retarder **AURORA**



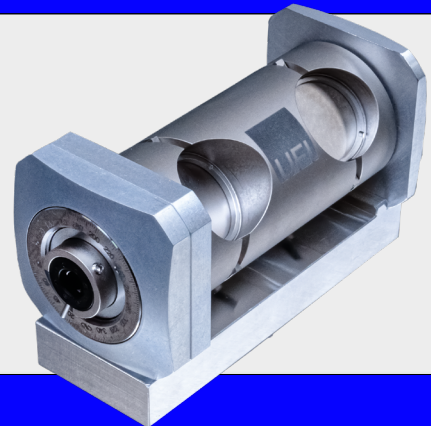
Our XUV phase retarder AURORA is designed to convert linearly polarized extreme ultraviolet (XUV) radiation into circularly or elliptically polarized light. It provides a compact and efficient solution for polarization control in a wide range of applications.

The retarder uses a transmission optimized, four mirror grazing incidence reflection geometry that induces a quarter-wave phase offset between the s- and p-polarization components of a linearly polarized input XUV beam.

AURORA exhibits negligible dispersion and supports broad spectral operation, with versions covering 10-40 eV and 40-85 eV. It is remotely controllable and vacuum compatible.

The outstanding dispersion properties and the minimal change to the delay line make AURORA perfectly suited for ultrafast and attosecond XUV sources, including high-harmonic-generation (HHG) beamlines. High-precision time-resolved experiments are feasible. The supported energy

ranges include important absorption edges of many elements, allowing polarization-dependent studies across materials science, magnetism, chemistry, and fundamental light-matter interaction research.



### Key Product Features:

- XUV quarter waveplate: generates circularly polarized XUV light without adding dispersion - ideal for attosecond experiments
- Up to ~ 40% max transmission (40-85 eV version)
- Up to ~ 30% max transmission (10-40 eV version)
- Compact design, with minimum change in the delay line
- Broad spectral range covering 40 – 85 eV (high-energy version) or 10 - 40 eV (low-energy version)
- Entrance and exit iris diaphragms for alignment
- Easy to implement in existing setups

### Characteristics:

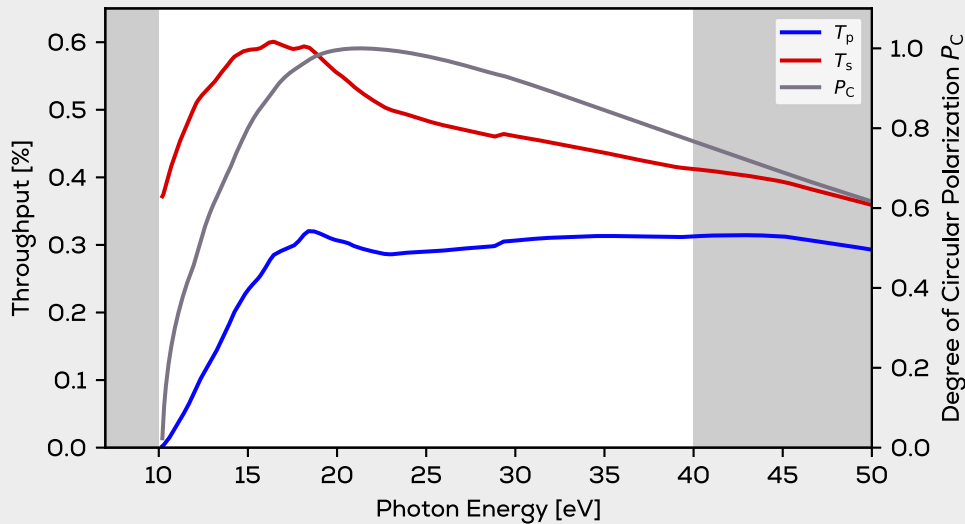
Spectral Range	10-40 eV	40-85 eV
Avg Transmission	>25%	>25%
Max Ellipticity $P_c^1$	1.0 @ 21 eV	0.85 @ 53eV (Fe) 0.75 @ 66 eV (Ni)
Extra Beam Path	3 mm	3 mm
Clear Aperture	3 mm	3 mm
Footprint	51mm (W) x 118mm (L)	51mm (W) x 118mm (L)

<sup>1</sup>Degree of Ellipticity expressed as Stokes Parameters  $P_c = S3/S0$

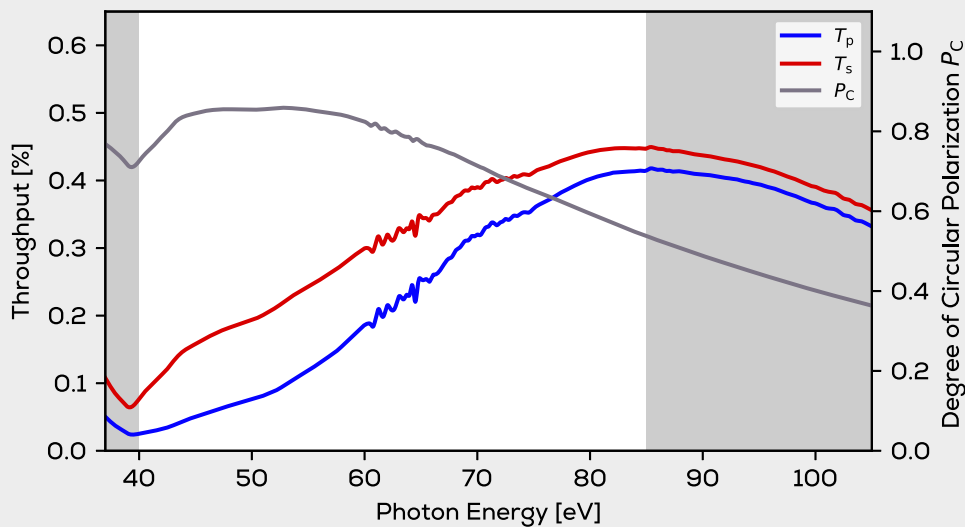
UltraFast Innovations GmbH  
Dieselstr. 5  
85748 Garching  
Germany

phone: +49 89 36039 - 437  
fax: +49 89 36039 - 453  
info@ultrafast-innovations.com  
www.ultrafast-innovations.com





*Throughput and Ellipticity low-energy version. The working range is limited to the white area.*



*Throughput and Ellipticity high-energy version. The working range is limited to the white area.*

**Application Note:**

AURORA is the perfect tool for attosecond magnetic circular dichroism (MCD) experiments. In Ref. [1], AURORA is used to provide high ellipticity and transmission at the Nickel M-edge (~66–68 eV) - directly enabling the element-specific tracking of coherent ultrafast spin dynamics in multilayer systems.

AURORA's working range also covers the M-edges of other transition metals, such as Fe or Co, see the table on the right.

Element	Fe	Co		Ni	
Edge	M <sub>2</sub> /M <sub>3</sub>	M <sub>2</sub>	M <sub>3</sub>	M <sub>2</sub>	M <sub>3</sub>
Energy / eV	52.7	58.9	59.9	66.2	68
Throughput	9%	17%	18%	26%	30%

**References:**

[1] Siegrist, F., Gessner, J.A., Ossiander, M. et al. Light-wave dynamic control of magnetism. *Nature* **571**, 240-244(2019).