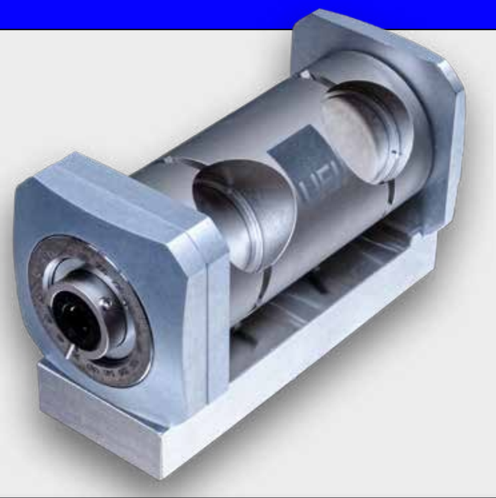
UltraFast Innovations

YOUR KEY to innovation and success

XUV Phase Retarder
AURORA



Our XUV Phase Retarder acts as a quarter waveplate to turn linearly polarized XUV light into circularly polarized light without introducing noticeable dispersion. The phase retarder achieves close-to-circular polarization of P_c=0.75 and obtains › 25% transmission around 66 eV photon energy, where the Ni M_2/M_3 edge locates [1].
A broad spectral range from 40 to 85 eV is supported to cover the M_2/M_3 edge of 3 transition metals - Fe, Co and Ni.
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. At the Ni M_2/M_3 transition up to 3% dichroism contrast is observed (i.e. › 85% of the theoretical value) [1].
A clear aperture of 3 mm will allow the low divergent XUV to pass through without clipping. Our XUV Phase Retarder is ideally geared to be combined with ultrafast high-harmonic XUV sources adding spin-sensitivity to conventional laser based pump-probe experiments via attosecond magnetic circular dichroism detection.

Key Product Features:

- Create circularly **polarized XUV light** without adding dispersion (ideal for attosecond applications)
- Up to ≈ **40% max transmission**
- Broad spectral range **covering 40 – 85 eV**
- Compact design, with minimum change in the delay line
- Entrance and exit iris diaphragms for alignment
- Easy to implement in existing setups

Characteristics:

Spectral Range	40-85 eV
Avg Transmission	›25%
Max Ellipticity Pc[1]	0.75 @ 66 eV
Extra Beam Path	3 mm
Clear Aperture	3 mm
Footprint	51mm (W) x 118mm (L)

[1] *Degree of Ellipticity expressed as Stokes Parameters P_c=S3/S0*

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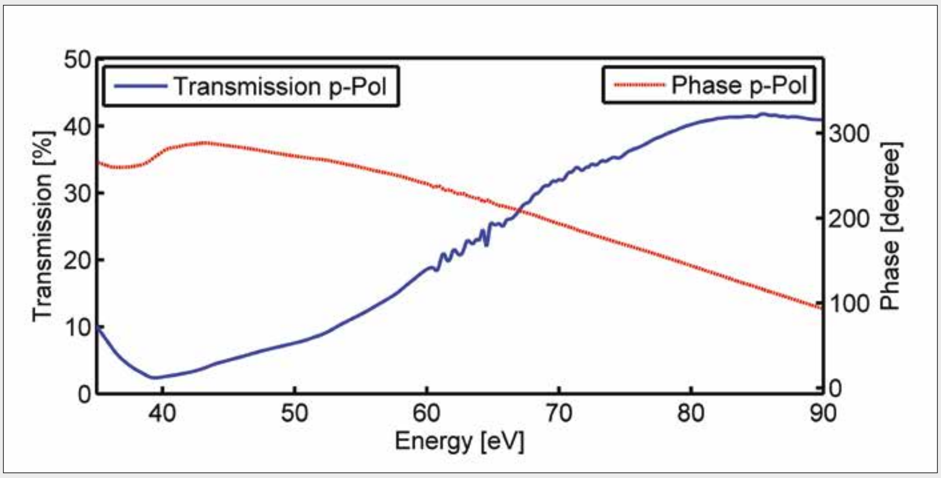
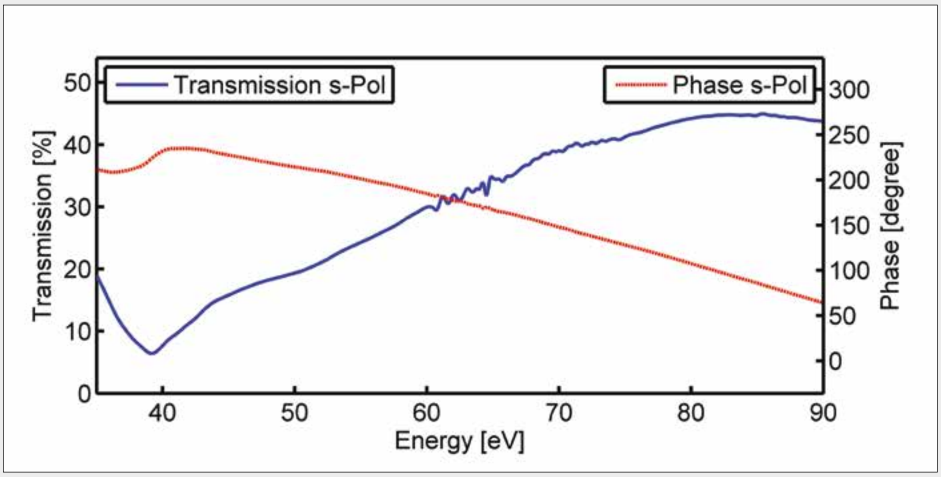


Phase and Transmission, p-Pol



Phase and Transmission, s-Pol

Element	Fe	Co		Ni	
Edge	M_2/M_3	M_2	M_3	M_2	M_3
Energy	52.7 eV	58.9 eV	59.9 eV	66.2 eV	68 eV
Transmission	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).*