

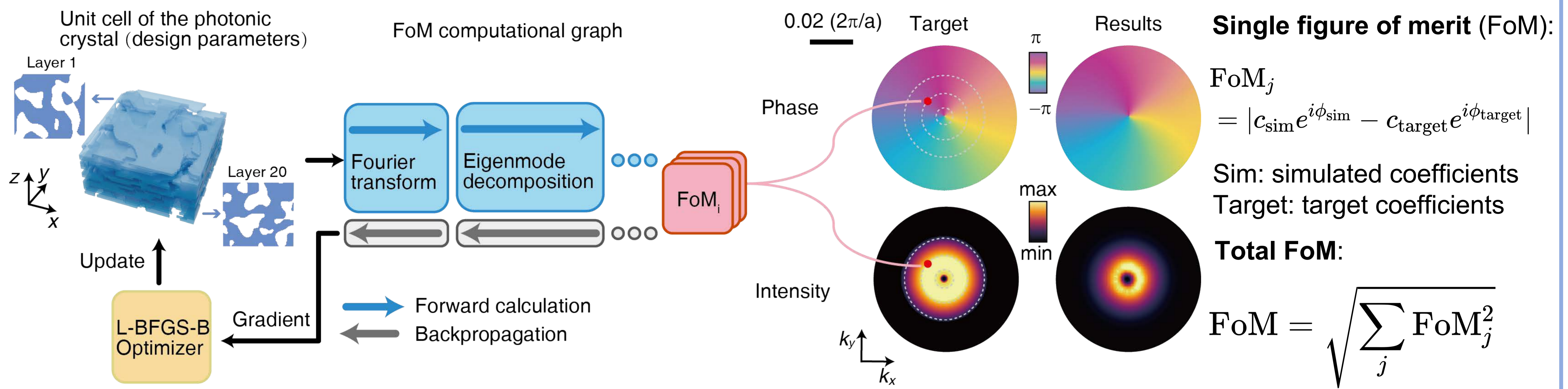
Inverse-designed photonic crystals for tailored OAM beam generation and multiplexing in momentum space

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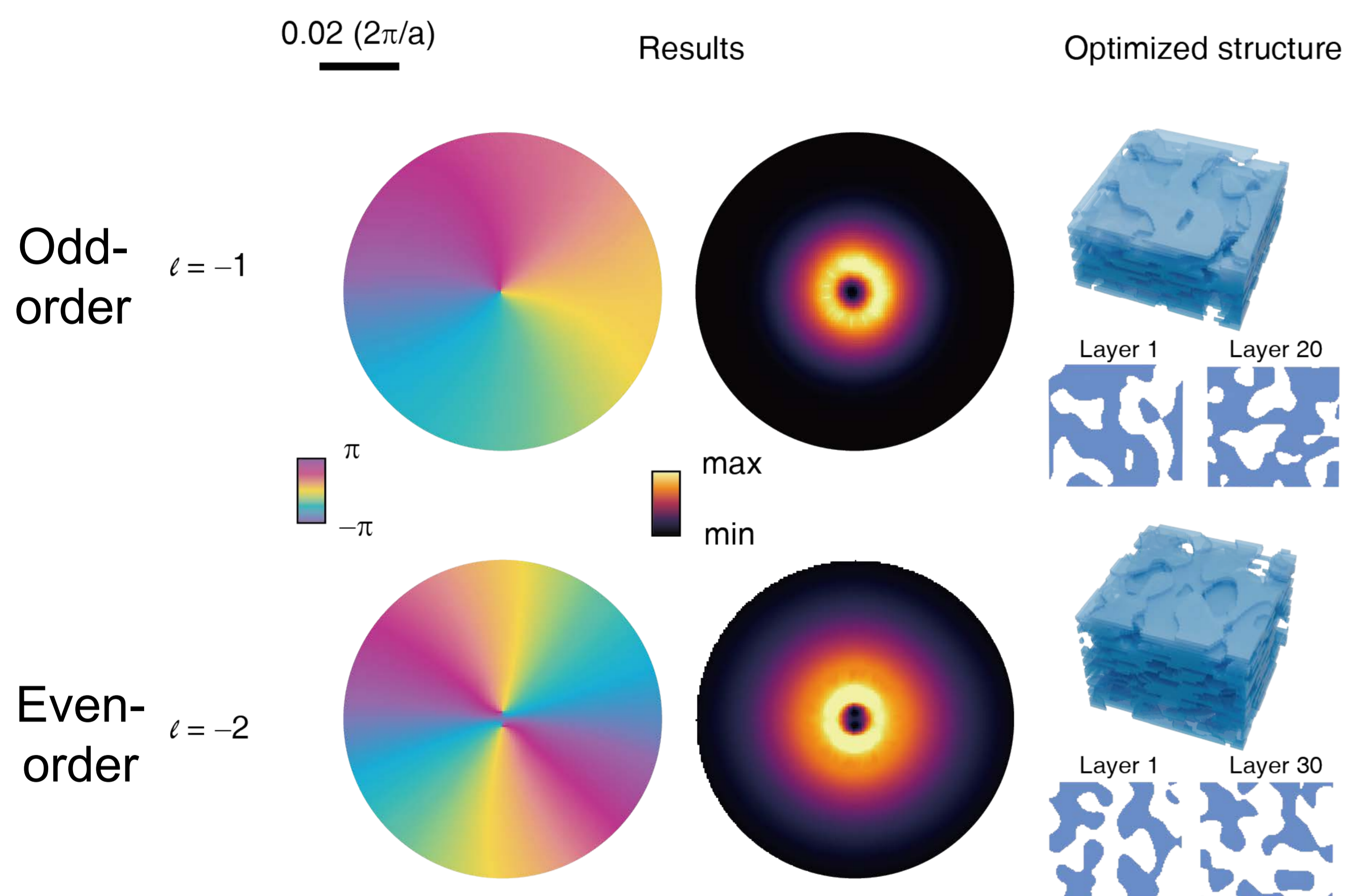
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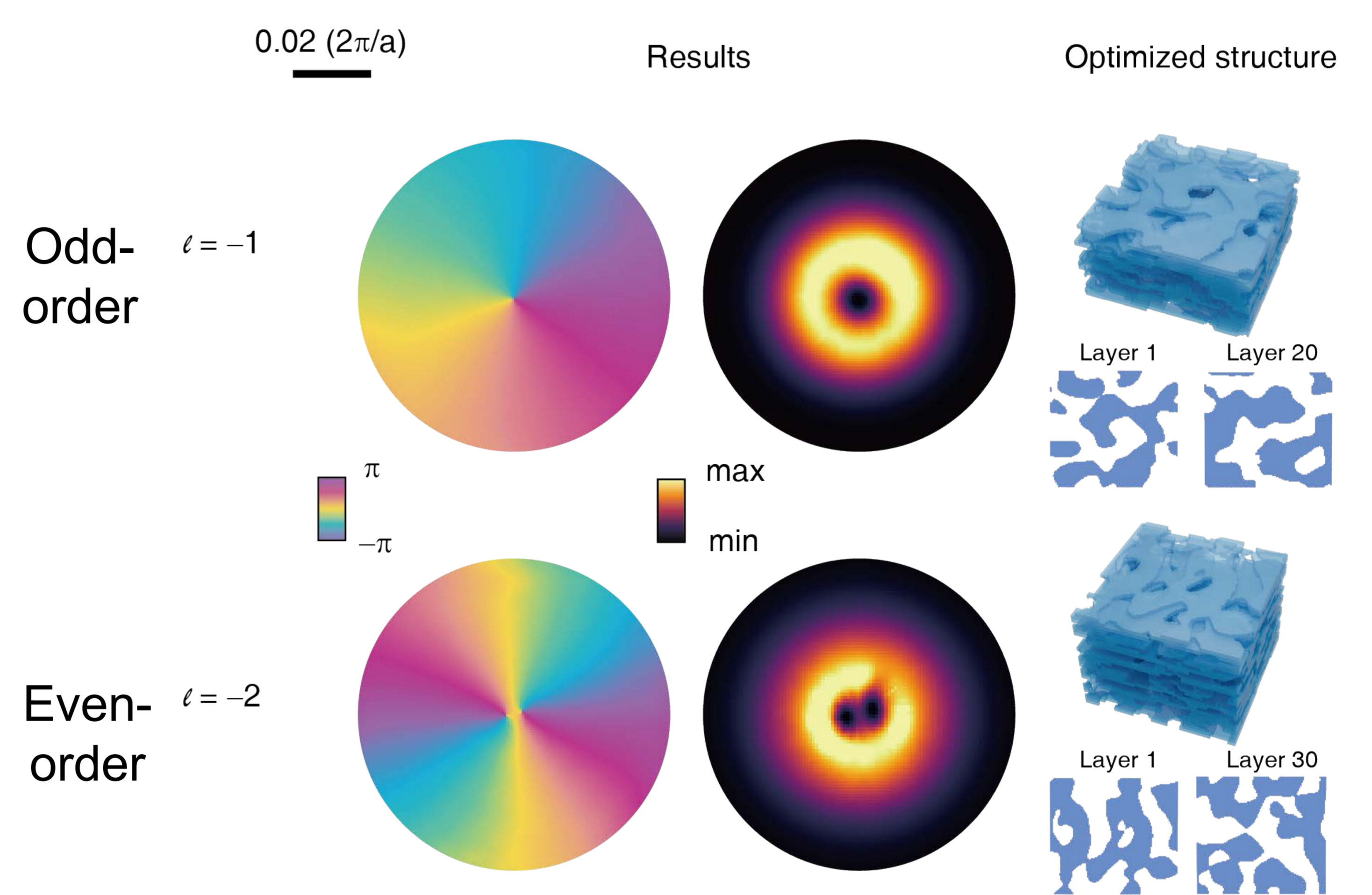
Optimization Scheme Based on Backpropagation



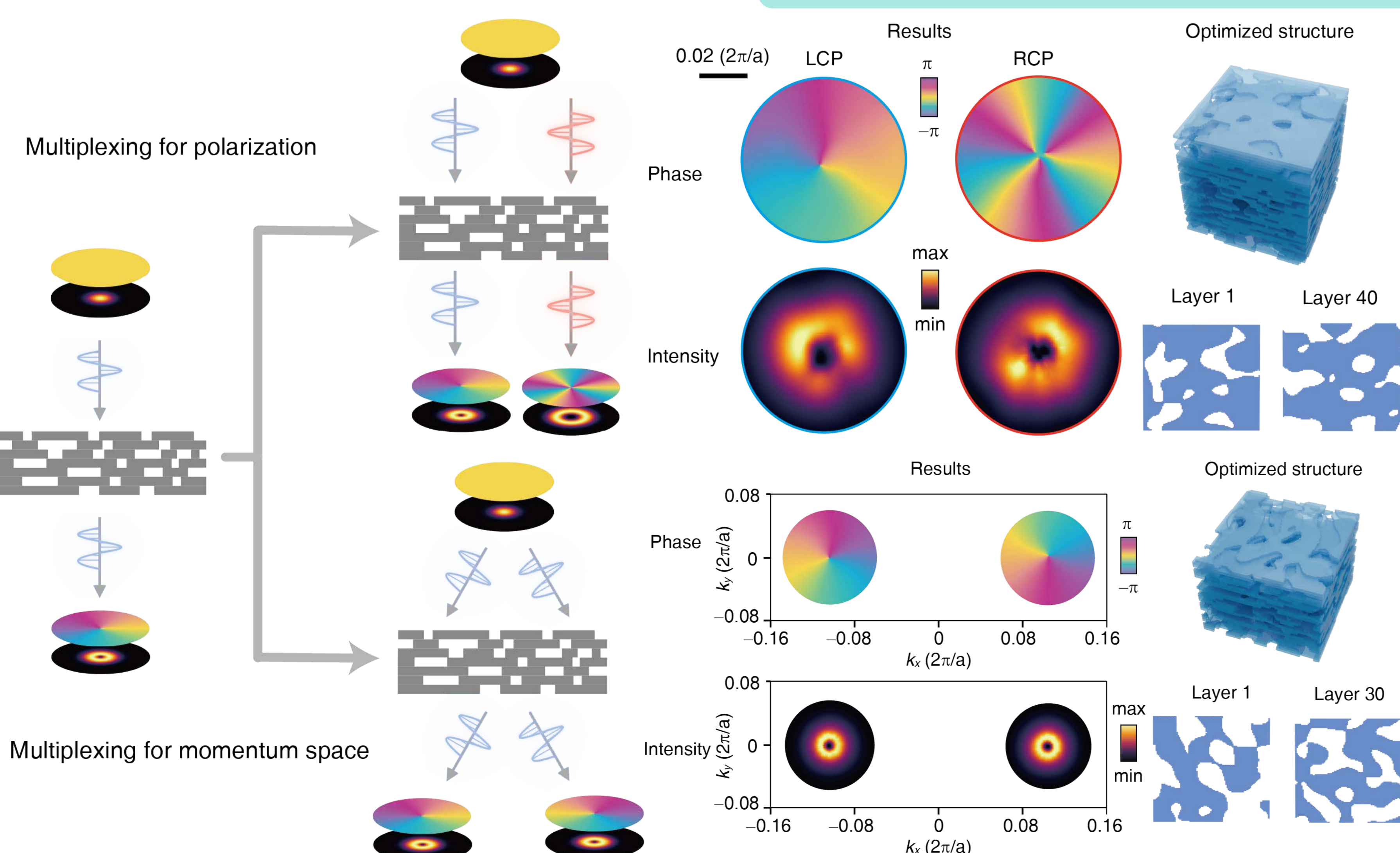
OAM Beams under Co-polarization



OAM Beams under Cross-polarization



Multiplexed OAM Beam Generation



Conclusion

1. Introducing an inverse design framework for photonic crystals that can generate high-performance vortex beams in momentum space with tailored properties.
2. Inversely designing photonic crystals to generate vortex beams with both even and odd OAM orders under co-/cross-polarization, breaking the limits of traditional design methods.
3. Inversely designing photonic crystals to generate vortex beams with various multiplexing schemes. Both polarization-division and momentum-space-division multiplexing are implemented, further expanding their applications.

Reference:

Deng, Ruhan, et al. "Inverse-designed photonic crystals for tailored OAM beam generation and multiplexing in momentum space." *Photonics Research*, 2026, **14**(3):834-841.