

# Complex Skin Modes in Non-Hermitian Hatano-Nelson Coupled Laser Arrays

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From biological systems to social media, connectivity plays a crucial role in determining the function, dynamics, and resiliency of a network. In the realm of non-Hermitian physics, the possibility of complex and asymmetric exchange interactions between a number of oscillators has been theoretically shown to lead to novel behaviors like delocalization, skin effect, and bulk-boundary correspondence. In this talk, by using active optical oscillators featuring non-Hermiticity and nonlinearity, we introduce an anisotropic exchange between the resonant elements in a lattice, an aspect that enables us to observe the non-Hermitian skin effect, phase locking, and near-field beam steering in Hatano-Nelson type laser array 1. Our work opens up new regimes of phase-locking in lasers while shedding light on the fundamental physics of non-Hermitian systems.

## References

- [1] Y G N Liu, O Hemmatyar, G G Pyrialakos, P S Jung, D N Christodoulides and M Khajavikhan, *Light Sci. Appl.* **11**, 336 (2022)