SEMINAR: Topological light for communicating, sensing, and trapping

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Seminar Room

Topological complex electromagnetic waves give access to nontrivial light-matter interactions and provide additional degrees of freedom for information transfer. For instance, topologically stable quasiparticles or skyrmions have been demonstrated in quantum fields, solid-state physics, and magnetic materials, but only recently observed in photonic fields, triggering fast expanding research across different spectral ranges and applications. Here I introduce an extended family of photonic skyrmions within a unified framework, starting from fundamental theories to experimental generation and topological control in spatiotemporally structured light. I will further highlight generalized classes of structured wave topological quasiparticles beyond optical skyrmions and outline their exotic topological robust properties, emerging applications, future trends, and open challenges.