

Speaker Abstracts Karlsruhe Days of Optics & Photonics



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Using symmetry for understanding and engineering light-matter interactions

Symmetry is one of the most general and useful concepts in physics. Correspondingly, symmetry-based results are among the most general statements that can be made about a given physical system. While this potential is routinely exploited in advanced theoretical physics, the use of symmetry as the primordial tool for understanding and engineering light-matter interactions is a less common approach. In my talk, I will first explain how symmetries and conservation laws help us advance our theoretical understanding, and then I will show that the symmetry-based insights provide us with useful guidelines for system design. I will illustrate the discussion with theoretical results in optical activity and backscattering suppression, and practical designs for enhanced sensing of chiral molecules and improved anti-reflection performance in solar cells.