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| Titolo | Light-Arthropod Interactions // by Serge Berthier, Bernd Schöllhorn |
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| ISBN | 3-031-76224-X |
| Edizione | [1st ed. 2026.] |
| Descrizione fisica | 1 online resource (564 pages) |
| Collana | Fascinating Life Sciences, , 2509-6753 |
| Altri autori (Persone) | SchöllhornBernd |
| Disciplina | 595 |
| Soggetti | Invertebrates Biophysics Optics Materials Bionics Microscopy Nanoscience Invertebrate Zoology Optics and Photonics Bioinspired Materials Optical Microscopy Nanoscale Biophysics |
| Lingua di pubblicazione | Inglese |
| Formato | Materiale a stampa |
| Livello bibliografico | Monografia |
| Nota di contenuto | Part 1: General -- Light, waves, photons -- Simplified phylogeny of arthropods. Focus on insects -- Characteristics of living structures: Multifunctionality, economy, disorder and complexity -- Vision, colorimetry, role of colours in the living world (influence of insect behaviour and survival: communication, social interactions, attraction, predation, camouflage, mimicry) -- Impact of light on living organisms: development/evolution, radiation protection (UV, blue), uptake of metabolites, pollination of flowers) -- Why are insects attracted to light? Light pollution (effects on insects, applications and threats) -- Part two: The Visible -- Introduction: Origin of colours (pigments, structures, emission) -- Pigments -- Physical colours -- Mixed systems -- Transparency. Why, how -- Bioluminescence (Fireflies, wireworms, |

etc.) -- Part three: The Ultraviolet -- Reflection and diffusion of UV, interaction flowers-insects -- Fluorescence / Phosphorescence: Principle -- Insects: fluorescent biomaterials and metabolites -- Other arthropods: Chelicerata, Myriapoda -- Oriented emission, guidance -- Part Four: The Infrared -- Insect thermoregulation: principles -- Solar infrared: absorption - Thermal infrared: Emission -- Fluorescence -- Part five: Characterization and modelling techniques -- Physical characterizations -- Chemical characterizations -- Modelling: Finite elements, RCWA, FDTD -- Part Six: Bio-inspiration.

Sommario/riassunto

Terrestrial arthropods (insects, spiders, etc.) dominate the world in numbers and extreme diversity. This book presents the combined views of a physicist, a chemist, and a biologist on the fascinating interactions of these organisms with the primary source of energy on Earth, light. It describes the plethora of important phenomena observed in different spectral ranges, from ultraviolet to visible to mid-infrared. These phenomena, often unprecedented, occur at all scales - macroscopic, microscopic, and nanoscopic. They are richly illustrated with original and aesthetic high-quality images. The descriptions and explanations are comprehensive for researchers and students as well as entomologists and, in general, accessible to anyone fascinated by the beauty and complexity of nature. More detailed explanations are presented in appendices for ease of reading. They may be omitted without affecting the general understanding of the main text. Researchers and engineers will also find numerous avenues for bioinspired developments in various fields such as energy, environment, agriculture, and ecology.
