Scattering and absorption in 2D optics

Mariani, F.

Stellingen

Behorende bij het proefschrift “Scattering and absorption in 2D optics”

I. Numerical simulations do not always allow one to obtain a complete physical picture of the simulated processes.
(Chapter 2 of this thesis)

II. Valuable information can be contained in the frequency, polarization, source location and propagation direction of coherent light, but also in the statistics of the speckle pattern it produces.
(Chapter 4 of this thesis)

III. When attempting to describe light propagation in ordinary complex media, the use of diffusion models is a compromise between a pragmatic approach and an exact description of transport.
(Chapter 4 of this thesis)

IV. The backscattering mechanism of rough thin films is richer than expected, and correction terms to the first order Born approximation for scattering are accessible experimentally.
(Chapter 5 of this thesis)

V. In the context of random media, the concept of an *optical mode* most appropriately indicates, as stated by Wiersma, a complex field distribution in a cavity-like random scattering medium. Any other meaning is misleading.
(D. S. Wiersma, Nature Photonics 7, 188–196 (2013))

VI. The role of near-field interactions in light transport in random media suggests that analogues of quasi-cylindrical waves also exist in textured thin-film solar cells.
(R. Rezvani Naraghi, PRL 115, 203903 (2015))

VII. The results that Liew et al. achieve in altering the photocurrent generated by a photovoltaic device by using wavefront shaping are

interesting for the potential they demonstrate, yet they do not constitute an example of *coherent control of absorption*.

(S. F. Liew et al., ACS Photonics *3* (3), 449–455 (2016))

VIII. Despite being often used to define roughness in solar-cell devices, the surface-profile variance and statistics, and the lateral correlation length are not sufficient as descriptors of a textured surface scattering properties, particularly in layered structures.

(L. C. Andreani, Solar Energy Mat. & Solar cells, 135, 78 (2015))

IX. Assumptions are always present in research and their identification is as important as posing the right questions. This task is part of a researcher's responsibility and can be of critical importance, particularly when conducting experiments.

X. In the current intellectual climate it is imperative that the scientific method is taught to younger generations.

XI. Scientific research is a collective endeavor and benefits particularly from the diverse and complementary set of skills that scientists as human beings can provide. As a consequence, it is a mistake to give any definition of the prototypical scientist.

Flavio Mariani

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