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Seeing through Distortion with Structured Light

Light can be tailored in its many degrees of freedom for so-called structured light. This opens many exciting avenues in seeing smaller in imaging, enhanced precision in manufacturing, and in optical communication and information processing, where the many forms of structured light can be used as an information alphabet. Unfortunately, light gets distorted when passing through noisy channels, negating the benefits of its initial structure. Here I will outline how to find degrees of freedom and forms of structured light that are invariant to noisy channels, and show near distortion-free transport of classical and quantum forms of structured light, even in highly distorted media.

Short bio:

Andrew has at various times in his career found himself as teacher, janitor, secretary, receptionist, web-master, systems engineer, sales rep, manager, director, and sometimes a scientist. Andrew is presently a Distinguished Professor within the School of Physics at the U. Witwatersrand (South Africa) where in 2015 he established a new laboratory for Structured Light. Andrew is active in promoting photonics in Africa, a founding member of the Photonics Initiative of South Africa and Director of South Africa's Quantum Roadmap. He is a Fellow of SPIE, Optica, the South African Institute of Physics (SAIP), and an elected member of the Academy of Science of South Africa. He holds an A-rating by the South African NRF, 4 honorary professorships, is editor-in-chief of the IoP's Journal of Optics and sits on the editorial board of five other international journals. Andrew has won several awards, including the NSTF national award for his contributions to photonics in South Africa, the Georg Forster prize from the Alexander von Humboldt Foundation for outstanding contributions to photonics, the SAIP Gold Medal, the highest award for physics in South Africa, making him the youngest winner to date, the Sang Soo Lee award from Optica and the Korean Optical Society and the TWAS Prize for Physics. Andrew spends his time having fun with the taxpayers' money, exploring structured light in lasers as well as classical and quantum optics.