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## **Topological Reactions in Partially Coherent Electromagnetic Beams**

The fully coherent, monochromatic waves that are encountered in standard textbooks are an idealization. In practice, light is always partially coherent. This is due to, for example, spontaneous emission or thermal fluctuations in the source. Also, if the light has traveled through atmospheric turbulence its coherence will be degraded. The statistical fluctuations of partially coherent light are described by correlation functions. In this talk, aimed at a graduate audience, I describe the various topological features, such as vortices, saddles and dipoles, that occur in correlation functions. Interestingly, these features can move arbitrarily close to each other and eventually be annihilated. As will be discussed, such topological reactions follow strict conservation laws.

Literature: E. Wolf, Introduction to the Theory of Coherence and Polarization of Light (Cambridge University Press, Cambridge, 2007).