

**A brief lecture on Complex Photonics:
from chaotic energy harvesting to diffractionless fields
generated by self-similarity**

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Complex systems are characterized the presence of many interacting degrees of freedom, which act together to sustain emergent properties of the whole ensemble. In classical statistical mechanics, complex systems are heavily studied as they are at the basis of nonequilibrium states of matter and complex phases such as structural and spin glasses. In Photonics, the study of complex systems is a relatively young subject of research, which offers plenty of possibilities to develop scale-free applications. In this talk, after a brief introduction on some general aspects of this topic, I will discuss two of my recent works encompassing how to harvest light energy from chaos and the generation of gradientless fields through self similar fractal structures.