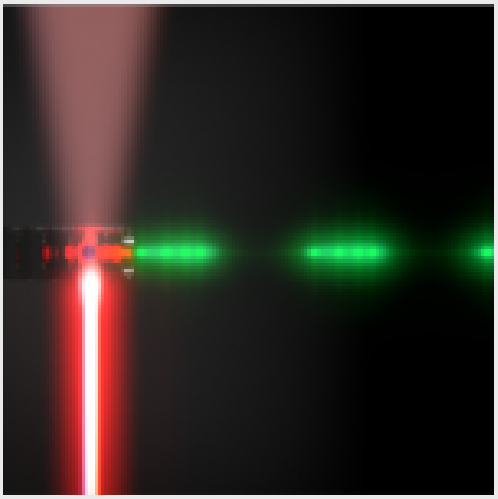
Emitters of N-photon bundles - published in Nature Photonics



A new type of light has been theorized by C. Sánchez Muñoz et al. whose findings have been published in Nature Photonics.

Abstract:
Controlling the output of a light emitter is one of the basic tasks in photonics, with landmarks such as the development of the laser and single-photon sources. The ever growing range of quantum applications is making it increasingly important to diversify the available quantum sources. Here, we propose a cavity quantum electrodynamics scheme to realize emitters that release their energy in groups (or 'bundles') of N photons (where N is an integer). Close to 100% of two-photon emission and 90% of three-photon emission is shown to be within reach of state-of-the-art samples. The emission can be tuned with the system parameters so that the device behaves as a laser or as an N-photon gun. Here, we develop the theoretical formalism to characterize such emitters, with the bundle statistics arising as an extension of the fundamental correlation functions of quantum optics. These emitters will be useful for quantum information processing and for medical applications.