Integrated single photons sources based on tapered optical nanofibers

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Abstract

We present the optical and quantum properties of highly efficient perovskite nanocubes and discuss our strategy towards a compact integrated single photon source.

1. Introduction

The interest in perovskite nanocrystals such as CsPbBr3 for quantum applications has rapidly increased, after the demonstration that they can exhibit very efficient single photon emission. The main drawback of these emitters is their photostability under optical excitation.

2. Discussion

We present a full characterization of the quantum properties of highly efficient perovskite nanocubes synthesized with a method which ensures an increased photostability. These emitters exhibit reduced blinking together with a strong photon antibunching. Remarkably these features are almost not affected by the increase of the excitation intensity well above the emission saturation levels.

3. Conclusions

We will discuss the different strategies we are pursuing to develop hybrid photonic devices by coupling single nanoemitters with photonic structures such as deep parabolic mirrors [1] and tapered nanofibers [2]. In particular the deposition of a single emitter on a nanofiber and the observation of single photon statistics through the guided mode of the fiber will be reported, showing the high potential of this platform for the realization of a compact integrated single photon source.

Finally we will show how this hybrid system is a very promising playground for novel chiral optics experiments, including a spin-orbit coupling effect for light [3].

References

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