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Single Photon Emitters in Boron Nitride Nanococoons[1]

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Quantum emitters in two-dimensional hexagonal boron nitride (hBN) are attractive for a variety of quantum and photonic technologies because they combine incredibly bright, room-temperature single-photon emission with an atomically thin crystal. However, the emitter's prominence is hindered by large, strain-induced wavelength shifts. Here, we report the discovery of single-photon emitters in boron nitride (BN) nanococoons that operate under ambient conditions. The BN nanococoon combines a bright, stable visible wavelength single-photon emitter with a zero-dimensional, nanoscale structure. Most notably, the BN nanococoon quantum emitter has an order-of-magnitude smaller wavelength variability than emitters in few-layer hBN. This low wavelength variability solves the central problem plaguing the otherwise-fantastic single photon emitters in 2D hexagonal boron nitride. Altogether, our discovery enlivens color centers in BN materials and, because of the BN nanococoon's size, opens new and exciting opportunities in nanophotonics, quantum information, biological imaging, and nanoscale sensing.

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