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Bright Single Photon Emitter in Silicon Carbide BENJAMIN LIENHARD, TIM SCHROEDER, SARA MOURADIAN, FLORIAN DOLDE, Massachusetts Inst of Tech-MIT, TOAN TRONG TRAN, IGOR AHARONOVICH, University of Technology Sydney, Australia, DIRK ENGLUND, Massachusetts Inst of Tech-MIT — Efficient, on-demand, and robust single photon emitters are of central importance to many areas of quantum information processing. Over the past 10 years, color centers in solids have emerged as excellent single photon emitters. Color centers in diamond are among the most intensively studied single photon emitters, but recently silicon carbide (SiC) has also been demonstrated to be an excellent host material. In contrast to diamond, SiC is a technologically important material that is widely used in optoelectronics, high power electronics, and microelectromechanical systems. It is commercially available in sizes up to 6 inches and processes for device engineering are well developed. We report on a visible-spectrum single photon emitter in 4H-SiC. The emitter is photostable at both room and low temperatures, and it enables 2 million photons/second from unpatterned bulk SiC. We observe two classes of orthogonally polarized emitters, each of which has parallel absorption and emission dipole orientations. Low temperature measurements reveal a narrow zero phonon line with linewidth < 0.1 nm that accounts for more than 30% of the total photoluminescence spectrum. To our knowledge, this SiC color emitter is the brightest stable room-temperature single photon emitter ever observed.

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