Abstract Submitted
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Towards High Density 3-D Memory in Diamond[1] JACOB HENSHAW, City College of New York- CUNY, Graduate Center-CUNY, SIDDHARTH DHOMKAR, City College of New York- CUNY, CARLOS MERILES, City College of New York- CUNY, Graduate Center-CUNY, HARISHANKAR JAYAKUMAR, City College of New York- CUNY — The nitrogen-vacancy (NV) center in diamond is presently the focus of widespread attention for applications ranging from quantum information processing to nanoscale metrology. Of great utility is the ability to optically initialize the NV charge state, which has an immediate impact on the center's light emission properties. Here, we use two-color microscopy in NV-rich, type-1b diamond to demonstrate fluorescence-encoded long-term storage of classical information. As a proof of principle, we write, reset, and rewrite various patterns with 2-D binary bit density comparable to present DVD-ROM technology. The strong fluorescence signal originating from the diffraction-limited bit volume allows us to transition from binary to multi-valued encoding, which translates into a significant storage capacity boost. Finally, we show that our technique preserves information written on different planes of the diamond crystal and thus serves as a platform for three-dimensional storage. Substantial enhancement in the bit density could be achieved with the aid of super resolution microscopy techniques already employed to discriminate between NVs with sub-diffraction, nanometer accuracy, a regime where the storage capacity could exceed 10^{17} bytes/cm^3

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