

Abstract Submitted
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Electronic nanoholography¹ CHRISTOPHER R. MOON, LAILA S. MATTOS, BRIAN K. FOSTER, GABRIEL ZELTZER, HARI C. MANOHARAN, Stanford University — We have developed a quantum holographic method to advance information density beyond the areal limits set by the discreteness of matter. We present experiments on information encoding using nanoscale writing with degenerate two-dimensional electrons. We show “pages” (letters encoded at specific energies) materialized by precisely engineering electron scattering environments with the tip of a scanning tunneling microscope. We then demonstrate that multiple pages can be encoded into the same region of space, using energy as a third holographic dimension. This form of holography produces non-volatile subnanometer features, tens of times smaller than the most precise optical or scanned-probe lithography, and information densities exceeding 5 bits per square nanometer.

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