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Bright Cathodoluminescent Thin Films for Scanning Nano-Optical Excitation and Imaging CRAIG HETHERINGTON, D.M. KAZ, C.G. BISCHAK, H.H. HOWARD, X. MARTI, J.D. CLARKSON, University of California, Berkeley, C. ADAMO, D.G. SCHLOM, Cornell University, R. RAMESH, S. ALONI, D.F. OGLETREE, N.S. GINSBERG, Lawrence Berkeley National Laboratory — Demand for visualizing nanoscale dynamics in biological and advanced materials continues to drive the development of sub-diffraction optical probes. While many strategies employ scanning tips for this purpose, we instead exploit a focused electron beam to create scannable nanoscale optical excitations in an epitaxially grown thin-film of cerium-doped yttrium aluminum perovskite (YAP:Ce), whose cathodoluminescence response is bright, robust, and spatially resolved to 18 nm. We also demonstrate lithographic patterning of the film's luminescence at the nanoscale. In combination with our observation of resonant energy transfer (RET) from the film to nearby fluorophores, preliminary results after exposing both faces of the scintillating film point toward a powerful means of fast, bright, non-invasive near-field optical microscopy without the complication of mechanical scanning.

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