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Photocurrent in Vanadium Dioxide[1] T. SERKAN KASIRGA, DONG SUN, JAE H. PARK, JAMES COY, XIAODONG XU, DAVID H. COBDEN, University of Washington — We investigate the photoresponse of VO_2 using scanning photocurrent microscopy below and above the metal-insulator transition at 67 $^\circ$C. To avoid complications of nonuniform strain and twinning boundaries we focus on single-crystal suspended nanobeams, where the strain is either minimal or well controlled. At intermediate temperatures the metallic and insulating phases coexist and a photocurrent and photoconductance associated with the boundary between them is seen. The magnitude and profile of the photoresponse above and below the transition demonstrates a photothermal mechanism, with fast electron-lattice relaxation and absence of built-in electric fields in the insulating phase consistent with strong electron-electron correlations and a short screening length.

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