

Abstract Submitted
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Strain-induced anisotropy in VO₂ film for metamaterial resonance switching and frequency tuning¹ DAAN LEIVA, TERRY DUNLOP, RAUL TORRICO, ROBERT MARVEL, California State University Long Beach, JED ZIEGLER, RICHARD HAGLUND, Vanderbilt University, YOHANNES ABATE, California State University Long Beach — Vanadium dioxide (VO₂) undergoes fascinating first order insulator-to-metal phase transition (IMT) around 68 °C. We demonstrate VO₂ thin-films grown on Si substrate exhibit strain induced metallic streaks that are unidirectional during IMT. We unveil the nanoscale formation and spatial dynamics of these streaks and further use the unique anisotropic property of the VO₂ film to dynamically tune the metamaterial resonances. We reveal thermal control of the metamaterial infrared resonances by nanoscale spatial near-field imaging of both the metallic streaks phase evolution on VO₂ film and the resonance states of the metamaterial.

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