Time-resolved infrared spectroscopy of superconducting NbTiN film near $\mathbf{H}_c^2$\textsuperscript{1} JUNGSEEK HWANG, University of Florida, HAIDONG ZHANG, University of Nebraska, DAVID H. REITZE, CHRISTOPHER J. STANTON, D.B. TANNER, University of Florida, G. LAWRENCE CARR, Brookhaven National Laboratory — We use subnanoseconds time-resolved, pump-probe infrared spectroscopy to study vortex dynamics of a conventional superconductor, Nb$_{0.5}$Ti$_{0.5}$N near $\mathbf{H}_c^2$. The measurements were performed at the National Synchrotron Light Source, Brookhaven National Laboratory; Picosecond pulses from a near-infrared Ti:sapphire laser were used as a pump and, subnanosecond pulses of infrared synchrotron radiation as a probe. We report detailed magnetic field dependences of the amplitude of photoinduced quasiparticles and the effective lifetime of the quasiparticles and also discuss vortex dynamics in the system near $\mathbf{H}_c^2$. Near $\mathbf{H}_c^2$, we observe an interesting deviation from the field-independent behavior of the effective lifetime at lower fields.

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