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Compact Femtosecond-Millisecond Transient Absorption Spectrometer ELIZABETH CARROLL, MELISSA HILL, DORTE MADSEN, KONSTANTIN MALLEY, DELMAR LARSEN, Department of Chemistry, University of California — The measurement of population dynamics in biological, chemical, and solid-state samples occurring over 10^{-15}-10^{1} seconds requires a combination of transient absorption techniques, typically involving different laser systems and detection electronics (e.g. femtosecond transient absorption and nanosecond flash photolysis). The difficulty in exactly matching excitation conditions often prohibits connecting ultrafast and longer time measurements, particularly in samples exhibiting nonlinear kinetics. We present a simple solution to bridge the femtosecond and microsecond domains with an inexpensive modification of a kHz amplified Ti:Sapphire laser. By introducing a secondary pulse-picker between the laser oscillator (75 MHz) and amplifier, we can electronically delay unamplified 800-nm probe pulses in 13.3-ns steps. The 5-nJ pulses seed a photonic crystal fiber to produce a supercontinuum (450-1100 nm) for broadband probing. We demonstrate the system capability by resolving formation and decay dynamics, spanning 10 decades (10^{-14}-10^{-4} s), of photoexcited solvated electrons in sinapic acid, and triplet states and quinonoid intermediates in Vitamin B_6.

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