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Time-resolved spatial phase measurements with 2-dimensional spectral interferometry[1] COLBY CHILDRESS, THOMAS PLANCHON, WAFA AMIR, JEFF A. SQUIER, CHARLES G. DURFEE, Physics, Colorado School of Mines — We are using 2-dimensional spectral interferometry for sensitive measurements of spatial phase distortions. The reference pulse and the time-delayed probe pulse are coincident on an imaging spectrometer, yielding spectral and spatial phase information. This technique offers the potential of higher sensitivity than traditional spatial interferometry since there are many fringes of data for each spatial point. We illustrate this technique with measurements of the thermal lensing profile in a cryogenically cooled Ti:sapphire amplifier crystal that is pumped by tens of watts of power from four frequency-doubled Nd:YLF lasers running at 1 kHz. By adjusting the relative delay of the probe and reference pulses, we characterize the thermal transients during and after the pump pulses. We compare the measured transient thermal profiles with those calculated with a finite-element model.

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