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Direct measurements of the nonlinear refractive index at high intensity in gases JARED WAHLSTRAND, YU-HSIANG CHENG, SINA ZAHEDPOUR, HOWARD MILCHBERG, University of Maryland — The intensity-dependent nonlinear refractive index of air and other gases is important in understanding the propagation of intense optical pulses in the atmosphere, as well as in applications such as supercontinuum generation in gas cells and hollow core fibers. In addition to the third-order response of the bound electrons, molecular alignment and the response of electrons freed by ionization may contribute substantially to the time-dependent nonlinear refractive index. Recently, there has been a resurgence of interest in the fundamental nonlinearity because of the possibility of a large higher-order Kerr effect. We present direct, absolute measurements of the optical nonlinearity in the noble gases and components of air using single-shot spectral interferometry and a thin gas target. We discuss artifacts caused by interference effects between the pump and probe beams when the probe beam is the same wavelength as the pump beam.

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