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Modification of ellipticity of light propagating in air[1] LADAN ARISSIAN, SHERMINEH ROSTAMI, JEAN CLAUDE DIELS, University of New Mexico, DIELS RESEARCH GROUP TEAM — We measure the polarization of IR pulses propagating in air. The linearly and elliptically polarized light of 60, 110 and 300 fs interact with air molecules for 4 meters. The peak intensity of light is determined by intensity clamping in laser filaments. The ellipticity of light changes when the light is close to circular polarization, a change that is measured for various pulse widths and energies. We observe the change of polarization even in the shortest pulse width of 60 fs, when alignment is mostly neglected. We do *not* observe a polarization change for linearly polarized light and polarization of lowest energy (9.6 mJ, 300 fs, the only case without filamentation) pulses. We show that elliptical polarization is not preserved in filament formation, consistent with the prediction by Close1966 that molecular orientation induces cross-phase modulation resulting in stronger self-focusing of the weaker polarization. Our high power filament polarization analyzer includes a grazing incidence (84°) plate followed by a Brewster plate (both 1 mm thick fused silica). The polarization is scanned by rotating a half wave plate by an angle θ prior to the fixed quarter plate. We measure energy and pulsewidth dependent polarization change around $\theta = 22.5^{\circ}$.

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