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Control of coherent nonlinear optical processes in turbid media THOMAS DRANE, EVGENY SHAPIRO, VALERY MILNER, University of British Columbia — Nonlinear optical signals such as sum-frequency mixing or coherent anti-Stokes Raman scattering (CARS) require laser beams with high spatiotemporal power density for their efficient generation. Random light scattering in turbid optical media reduces the intensity and peak power of laser pulses by lowering their degree of spatial and temporal coherence. We investigate the use of wavefront shaping to increase the sum frequency mixing (SFM) of two ultrashort laser pulses which have passed through an optically diffusive material. Using the spectrally filtered SFM intensity as feedback, we apply a simple search algorithm to find the optimal two-dimensional phase mask for enhancing the nonlinear signal behind the diffuser. Our preliminary results show that increasing the total SFM intensity is possible. This technique should improve the utility of nonlinear optical methods for chemical analysis in turbid environments.

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