GPC light shaping a supercontinuum source

Generalized Phase Contrast (GPC) is a versatile tool for efficiently rerouting and managing photon energy into speckle-free contiguous spatial light distributions. We have previously shown theoretically and numerically that a GPC Light Shaper shows robustness to shift in wavelength and can maintain both projection length scale and high efficiency over a range \([0.75\lambda_0; 1.5\lambda_0]\) with \(\lambda_0\) as the characteristic design wavelength. With this performance across multiple wavelengths and the recent availability of tabletop supercontinuum lasers, GPC light shaping opens the possibility for creatively incorporating various multi-wavelength approaches into spatially shaped excitations that can enable new broadband light applications. We verify this new approach using a supercontinuum light source, interfaced with a compact GPC light shaper. Our experiments give \(~70\%\) efficiency, \(~3\times\) intensity gain, and \(~85\%\) energy savings, limited, however, by the illumination equipment, but still in very good agreement with theoretical and numerical predictions.

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