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Title:Improving depth-of field in broadband THz beams using nondiffractive Bessel beams
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Abstract:We report new results related to imaging using broadband Bessel-like beams at the terahertz (THz) domain that were generated by use of axicons and pulsed THz radiation emitting at a bandwidth 0.1 to 1 THz. Such Bessel-like beams exhibit an invariant line of focus with an extended length compared to Gaussian-beams Rayleigh range, which enables imaging through the extended length. We demonstrate this imaging property using a resolution target illuminated by broadband-THz beams and show an improvement by a factor of 3.5 in imaging depth while using Bessel-like beams over Gaussian beams. Our results highlight the potential in using broadband THz radiation together with nondiffractive Bessel beams to significantly improve spatial separation over deep view.
Number of references:17
Inspec controlled terms:laser beams - lenses - optical images - optical self-focusing - terahertz wave imaging
Uncontrolled terms:broadband THz beams - nondiffractive Bessel beams - depth-of field - optical imaging - broadband Bessel-like beams - terahertz domain - axicons - pulsed THz radiation - invariant focus line - resolution target illumination - broadband THz radiation - bandwidth 0.1 THz to 1 THz
Inspec classification codes:A4260H Laser beam characteristics and interactions - A4265J Beam trapping, self focusing, thermal blooming, and related effects - A4280A Optical lenses and mirrors - B4330 Laser beam interactions and properties - B4340J Optical self-focusing and related effects - B4190 Other optical system components
Numerical data indexing:bandwidth 1.0E+11 1.0E+12 Hz
Treatment:Experimental (EXP)
Discipline:Physics (A); Electrical/Electronic engineering (B)
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