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Wide-Angle Spectral Split-Step Method for 2D or 3D Beam Propagation[1] CLIFTON CLARK, UTSA, ROBERT THOMAS, USAF, RHDO TEAM — We develop a method for non-paraxial beam propagation that obtains a speed improvement over the Finite-Difference Split-Step method (FDSSNP) recently reported by Sharma *et al.*. The method works in the eigen-basis of the Laplace operator (∇_T^2), and in general requires half as many operations to propagate one step forward so that a 2X speedup can be realized. However, the new formulation allows the Fast Fourier Transform (FFT) algorithm to be used, which allows an even greater speedup. The method does not require a numerical matrix inversion, diagonalization, or series evaluation. The diffraction operator is not approximated, and in the absence of refractive index fluctuations the method reduces to an exact solution of the Helmholtz equation.

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