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A Perturbative Quantized Twist Embedded in Minkowski Spacetime. JAMES STROHABER, Florida A&M University — We present results on spatially-structured gravitational waves within the paraxial approximation. Drawing upon analogies between electrodynamics and general relativity, gauge invariant paraxial "electric" and "magnetic" parts of the Weyl conformal tensor are derived. In this approximation, a new gauge, which we call the paraxial-traceless gauge, is found. The polarization and degrees of freedom are investigated and compared with the Eardley-Newman-Penrose classification. Paraxial gravitational waves are found to share similarities with their electromagnetic counterparts in that they can possess a quantized amount of orbital angular momentum that can be transferred to matter.

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