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Linked Gravitational Radiation[1] AMY THOMPSON, University of California, Santa Barbara, JOSEPH SWEARNGIN, Leiden University, ALEXANDER WICKES, University of California, Santa Barbara, JAN WILLEM DALHUISEN, Leiden University, DIRK BOUWMEESTER, University of California, Santa Barbara — The electromagnetic knot is a topologically nontrivial solution to the vacuum Maxwell equations with the property that any two field lines belonging to either the electric, magnetic, or Poynting vector fields are closed and linked exactly once [1]. The relationship between the vacuum Maxwell and linearized Einstein equations, as expressed in the form of the spin-N massless field equations, suggests that gravitational radiation possesses analogous topologically nontrivial field configurations. Using twistor methods we find the analogous spin-2 solutions of Petrov types N, D, and III. Aided by the concept of tendex and vortex lines as recently developed for the physical interpretation of solutions in general relativity [2], we investigate the physical properties of these knotted gravitational fields by characterizing the topology of their associated tendex and vortex lines.

[1] Ranada, A. F. and Trueba, J. L., Mod. Nonlinear Opt. III, 119, 197 (2002).
[2] Nichols, D. A., et al., Phys. Rev. D, 84 (2011).

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