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Bi-twistors: an extension of twistor theory for general space-times

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Twistor theory was initially developed to describe the geometry of Minkowski space-time in terms of its null geodesics. The natural generalization to curved space-times requires the ubiquitous existence of α-surfaces, this requiring the Weyl curvature to be anti-self-dual, which for a real space-time implies conformal flatness. A bi-twistor, however, incorporates both a twistor and a dual-twistor, together with their canonical commutation relations, and the role of the α-surfaces is simply replaced by that of null geodesics, which are ubiquitous in any space-time. Accordingly, bi-twistor theory can be developed so as to apply to space-times generally.

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