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**Itzhak Bars\*** ([bars@usc.edu](mailto:bars@usc.edu)), Department of Physics and Astronomy, University of Southern California, Los Angeles, CA 90089-0484. *Twistors and 2T-physics as unifiers of 1T-physics systems.*

2T-physics in 4+2 dimensions is used as a tool to construct a generalized twistor transform for spinning particles in 3+1 dimensions that unifies many types of particle dynamics. The particle systems described by the same twistor include not only freely moving massless relativistic particles in flat 3+1 space-time, but also massive relativistic or non-relativistic particles, non-interacting or interacting in special ways, and moving in special curved space-times. A common feature of the unified systems is that they all have a hidden global  $SU(2,3)$  symmetry and they all are in the same fixed infinite dimensional unitary representation of this symmetry. Furthermore, their classical and quantum dynamics are all captured by the same  $SU(2,2)$  twistor. This  $SU(2,2)=SO(4,2)$  is the familiar conformal symmetry for the case of massless particles, but is a hidden unfamiliar symmetry of the other systems. Because of the underlying hidden twistor and  $SU(2,3)$  properties there exists remarkable duality relationships among these systems. (Received September 16, 2008)