Abstract Submitted
for the APR07 Meeting of
The American Physical Society

Alternate Lorentz Transformations of Spacetime Coordinates and Maxwell and Dirac Fields ROLLIN S. ARMOUR, JR., JOSE L. BALDUZ, JR., Mercer University — Spacetime coordinates may transform under any one of five representations of the Lorentz group and yield well-defined Lorentz transformations for the Maxwell and Dirac fields. These reps are (1/2,1/2), (0,0)+(0,1), (0,0)+(1,0), (1/2,0)+(1/2,0), and (0,1/2)+(0,1/2). Doubling the usual four-component Dirac field into eight components, the Maxwell field and this doubled Dirac field transform under at least two shared rules in each of these five spacetimes. In four-vector spacetime, we find a spin-1/2 Maxwell field and a spin-1 eight-component Dirac field. These two have a Lagrangian density and a set of Minkowski-signature invariants common to all of their Lorentz transformations across all five spacetimes. We discuss the sixteen possible coordinate and field transformations for these two fields, and the five possibilities for the four-component Dirac field, leaving their respective equations covariant under the Lorentz group.

Rollin S. Armour, Jr.
Mercer University

Date submitted: 12 Jan 2007 Electronic form version 1.4