

## Wave-Functions for Spin-3/2 and Integer Spin Fields

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**Abstract.** Following the Bargmann-Wigner formalism, wave-functions for integer and spin-3/2 fields are constructed within geometric algebra. This is achieved through the multiparticle space-time algebra, where the number of copies of the space-time algebra corresponds to the number of spinor fields needed to construct the wave-function. However, this formalism breaks down if a gauge field is introduced. This is resolved by introducing a symmetrised version of the covariant derivative, such that it obeys the Duffin-Kemmer algebra. Furthermore, new interesting results are found for the energy-momentum tensors.

**Keywords.** Geometric algebra, multiparticle quantum theory, Bargmann-Wigner equations, Duffin-Kemmer algebra, Dirac equation, Proca equations, Maxwell equations, Klein-Gordon equation, chiral symmetry, Rarita-Schwinger equations, energy-momentum tensor.

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