# Eigenstates of Generalized de Broglie-Bargmann-Wigner Equations for Photons with Partonic Substructure

H. Stumpf

Institute of Theoretical Physics, University Tuebingen

Reprint requests to Prof. H. St.; E-mail: regine.adler@uni-tuebingen.de

Generalized de Broglie-Bargmann-Wigner Equations are relativistically invariant quantum mechanical many body equations with nontrivial interaction, selfregularization and probability interpretation. The partonic substructure of electroweak gauge bosons is assumed to result from two fermionic constituents in accordance with de Broglie's fusion theory. For this case exact vector boson solutions are studied. The quantum numbers of these states are derived and lead to a $SU(2) \otimes U(1)$ classification, where the photon states are identified with the $U(1)$ representation for simplicity. In addition the angular momentum conditions for these states are discussed and it is shown that owing to selfregularization the corresponding secular equations of these states are finite and lead to the phenomenological wave equation of the photon as its effective dynamics.

*Key words:* Relativistic two-body Equations; Composite Photons; Photon Structure.