

Saar, R.; Loide, R. K.; Ots, I.; Tammelo, R.

“Dynamical” representation of the Poincaré algebra for higher-spin fields in interaction with plane waves. (English) [Zbl 0930.35150](#)

J. Phys. A, Math. Gen. 32, No. 12, 2499-2508 (1999).

Summary: To avoid the defects of higher-spin interaction theory, the field-dependent invariant representation (the ‘dynamical’ representation) of the Poincaré algebra is considered as a dynamical principle. A general ‘dynamical’ representation for a single elementary particle of arbitrary spin in the presence of a plane-wave field is constructed and the corresponding forms of the higher-spin interaction terms are found. The properties of relativistically invariant first-order higher-spin equations with the ‘dynamical’ interaction are examined.

It is shown that the Rarita-Schwinger spin- $\frac{2}{2}$ equation with the ‘dynamical’ interaction is causal and free from algebraic inconsistencies. As distinct from the first-order higher-spin relativistic equations with the minimal coupling, there exist the Klein-Gordon divisors for the first-order equations with the non-minimal, ‘dynamical’ interaction, and the corresponding Klein-Gordon equations are causal.

MSC:

[35Q40](#) PDEs in connection with quantum mechanics

[81R05](#) Finite-dimensional groups and algebras motivated by physics and their representations

Cited in 1 Document

Keywords:

dynamical representation of the Poincaré algebra; higher-spin interaction theory; Rarita-Schwinger spin- $\frac{2}{2}$ equation; Klein-Gordon equations

Full Text: [DOI](#)