Dipartimento di Matematica e Fisica
"Ennio De Giorgi"

UNIVERSITÀ DEL SALENTO
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Avviso di due Seminari

Venerdì 24 Gennaio 2025 Ore 15:00
Aula "Seminari"
Dipartimento di Matematica e Fisica "E. De Giorgi"

On Z2*Z2-graded Lie algebras and superalgebras and applications

Z. Kuznetsova

(Federal Univ. of ABC, Sao Paulo, Brazil)

In the 1970s, Rittenberg and Wyler introduced "color" Lie algebras and superalgebras—graded structures where the grading is determined by a group G, with the algebraic product depending on the grading. Recently, symmetries defined by higher-graded Lie algebras have gained renewed interest.

This talk explores two distinct graded algebraic structures: (1) Z2*Z2-graded Lie algebras and (2) Z2*Z2-graded Lie superalgebras. These gradings lead to systems with unique properties. In the first case, exotic bosons coexist with "normal" bosons, while in the second case, the theory requires the inclusion of parafermions alongside exotic bosons. After introducing Z2*Z2-graded Lie algebras and superalgebras, we discuss the classification of "minimal" structures, the definition of graded (super)spaces, the construction of physical models, and the emergence of new coordinates and graded Lorentz generators.

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On the detectability of paraparticles

F. Toppan

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Unlike anyons (which live in 2 space dimensions and transform under the braid group), paraparticles beyond bosons and fermions (living in any space dimension and transforming under the permutation group) have been dismissed for a long time as unobservable; this common wisdom as based on the so-called "conventionality of parastatistics" argument.
In recent years this conventional wisdom has been challenged and put to a test. Mechanisms which allow to overcome the conventionality argument have been elucidated; theoretical toy-models whose paraparticles are detectable have been presented. On the experimental side, recent advances in engineering paraparticles in the laboratory suggest the possibility of an experimental detection of this type of parastatistics.

Ref. Prof. Raffaele Vitolo