

1. Record Nr.	UNINA9910810875403321
Titolo	Harmonic superspace // A.S. Galperin ... [et al.]
Pubbl/distr/stampa	Cambridge ; ; New York, : Cambridge University Press, 2001
ISBN	1-107-12276-7 1-280-43043-5 9786610430437 0-511-17451-9 0-511-04145-4 0-511-15445-3 0-511-32835-4 0-511-53510-4 0-511-04763-0
Edizione	[1st ed.]
Descrizione fisica	1 online resource (xiv, 306 pages) : digital, PDF file(s)
Collana	Cambridge monographs on mathematical physics
Altri autori (Persone)	GalperinA. S <1954-> (Alexander Samoilovich)
Disciplina	539.7/25
Soggetti	Supersymmetry
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Title from publisher's bibliographic system (viewed on 05 Oct 2015).
Nota di bibliografia	Includes bibliographical references (p. 289-303) and index.
Nota di contenuto	Brief motivations -- Spaces and superspaces -- Chirality as a kind of Grassmann analyticity -- $N = 1$ chiral superfields -- Auxiliary fields -- Why standard superspace is not adequate for $N = 2$ supersymmetry -- Search for conceivable superspaces (spaces) -- $N = 2$ harmonic superspace -- Dealing with the sphere $S^2$ -- Comparison with the standard harmonic analysis -- Why harmonic superspace helps -- $N = 2$ supersymmetric theories -- $N = 2$ matter hypermultiplet -- $N = 2$ Yang-Mills theory -- $N = 2$ supergravity -- $N = 3$ Yang-Mills theory -- Harmonics and twistors. Self-duality equations -- Elements of supersymmetry -- Poincare and conformal symmetries -- Poincare group -- Conformal group -- Two-component spinor notation -- Poincare and conformal superalgebras -- $N = 1$ Poincare superalgebra -- Extended supersymmetry -- Conformal supersymmetry -- Central charges from higher dimensions -- Representations of Poincare supersymmetry -- Representations of the Poincare group -- Poincare

superalgebra representations. Massive case -- Poincare superalgebra representations. Massless case -- Representations with central charge -- Realizations of supersymmetry on fields. Auxiliary fields --  $N = 1$  matter multiplet --  $N = 1$  gauge multiplet -- Auxiliary fields and extended supersymmetry -- Superspace -- Coset space generalities -- Coset spaces for the Poincare and super Poincare groups --  $N = 2$  harmonic superspace -- Harmonic variables -- Harmonic covariant derivatives --  $N = 2$  superspace with central charge coordinates.

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## Sommario/riassunto

This is a pedagogical introduction to the harmonic superspace method in extended supersymmetry. Inspired by exciting developments in superstring theory, it provides a systematic treatment of the quantum field theories with  $N=2$  and  $N=3$  supersymmetry in harmonic superspace. The authors present the harmonic superspace approach as a means of providing an off-shell description of the  $N=2$  supersymmetric theories, both at the classical and quantum levels. Furthermore, they show how it offers a unique way to construct an off-shell formulation of a theory with higher supersymmetry, namely the  $N=3$  supersymmetric Yang-Mills theory. Harmonic Superspace makes manifest many remarkable geometric properties of the  $N=2$  theories, for example, the one-to-one correspondence between  $N=2$  supersymmetric matter, and hyper-Kahler and quaternionic manifolds. This book will be of interest to researchers and graduate students working in the areas of supersymmetric quantum field theory, string theory and complex geometries.

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