

Algebraic and geometric properties of (conformal) mechanics with extended supersymmetry

Initiative: Zwischen Europa und Orient - Mittelasien/Kaukasus im Fokus der Wissenschaft

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The main goal of the project is to get further insights into the geometrical, group-theoretical and algebraic structure of one-dimensional theories with extended supersymmetry, into their close relationships with higher-dimensional theories, integrable models and condensed matter physics. Fundamental properties of super (conformal) mechanics will be brought to light by studying the dualities and hidden symmetries of the models. New models of quantum mechanics with extended supersymmetry will be constructed and applied to analyze the AdS/CFT correspondence, to exhibit integrable structures in supersymmetric theories, to explore (super)extensions of the Hall effect and study the partial breaking of supersymmetry in superparticle models. A general result of this investigation will be an improved classification of the one-dimensional supermultiplets and related supersymmetric mechanics models as well as their application to the construction of supersymmetric integrable multi-particle systems of Calogero type and their applications in condensed matter physics.

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