High Energy Physics - Theory

Graded Hopf Maps and Fuzzy Superspheres

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We argue supersymmetric generalizations of fuzzy two- and four-spheres based on the unitary-orthosymplectic algebras, $uosp(N|2)$ and $uosp(N|4)$, respectively. Supersymmetric version of Schwinger construction is applied to derive graded fully symmetric representation for fuzzy superspheres. As a classical counterpart of fuzzy superspheres, graded versions of 1st and 2nd Hopf maps are introduced, and their basic geometrical structures are studied. It is shown that fuzzy superspheres are represented as a "superposition" of fuzzy superspheres with lower supersymmetries. We also investigate algebraic structures of fuzzy two- and four-superspheres to identify $su(2|N)$ and $su(4|N)$ as their enhanced algebraic structures, respectively. Evaluation of correlation functions manifests such enhanced structure as quantum fluctuations of fuzzy supersphere.

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