Superbosonization and Supergeometry

Abstract:
The classical bosonization or boson-fermion correspondence by Coleman and Mandelstam is a procedure which converts the fermionic annihilation and creation operators on fermionic Fock space into bosonic quantities. As shown by Frenkel, it can be recast as an isomorphism between canonical infinite-dimensional representations of an infinite Heisenberg and an infinite Clifford algebra, respectively, which extend to a simple representation of an affice Lie algebra. It has far-reaching consequences, for instance, it leads to Jacobi identities for elliptic θ-functions, as shown by Kac.

Superbosonization, introduced by Littelmann-Sommers-Zirnbauer, is a far-reaching generalisation of the bosonization correspondence, with application in random matrix theory. We explain how it can be understood and derived by the systematic use of certain supergroup actions.

PD Dr. Alexander Alldridge