

Critical Symmetry and Supersymmetry

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Recently, a new concept, called critical symmetry, has been introduced [1] and applied to the study of nuclear spectra. Critical symmetry is an attempt to describe in explicit analytic form properties of systems at the critical value of a quantum phase transition. Introduced initially for the critical value of the U(5)-SO(6) (spherical to γ -unstable deformed) transition in nuclei, called E(5) [1], and applied to the study of Ba [2] and other isotopes, it was subsequently expanded [3] to the critical value of the U(5)-SU(3) (spherical to axially deformed) transition, called X(5), and applied to the study of Sm [4] and other isotopes.

Very recently [5], the concept has been further expanded to describe in explicit analytic form properties of mixed systems of bosons and fermions at the critical value of a quantum phase transition, called critical supersymmetry.

In this talk, critical symmetries will be reviewed and critical supersymmetries will be introduced, with particular emphasis to the latter for which direct evidence is not yet available. Several experiments will be suggested to test the possible occurrence of critical supersymmetries in nuclei.

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