



Nuclear Theory

Symmetries, Supersymmetries, and Pairing in Nuclei

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These summer school lectures cover the use of algebraic techniques in various subfields of nuclear physics. After a brief description of groups and algebras, concepts of dynamical symmetry, dynamical supersymmetry, and supersymmetric quantum mechanics are introduced. Appropriate tools such as quasiparticles, quasispin, and Bogoliubov transformations are discussed with an emphasis on group theoretical foundations of these tools. To illustrate these concepts three physics applications are worked out in some detail: i) Pairing in nuclear physics; ii) Subbarrier fusion and associated group transformations; and iii) Symmetries of neutrino mass and of a related neutrino many-body problem.

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