1 Theoretical Particle and High Energy Physics Group

Research Subjects: The Unification of Elementary Particles & Fundamental Interactions

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The main research interests at our group are in superstring theory, quantum theory of gravity and unification theories. Superstring theory, supersymmetric field theories, topological field theories and conformal field theories are analyzed relating to the fundamental problems of interactions. In the field of high energy phenomenology, supersymmetric unified theories are extensively studied and cosmological problems are also investigated. In addition to these topics, we also study various problems in quantum field theory, from the viewpoints of both continuum and lattice approaches.

We list the main subjects of our researches below.

1. String Theory
   - 1.1 Supersymmetric Gauge Theories and Superstrings [1]
   - 1.2 Strings and D-branes on Curved Backgrounds [2, 16, 17, 40, 48, 49]
   - 1.3 String Field Theory [23, 24, 31, 32, 33, 34, 36, 37]
   - 1.4 String Theories on PP-waves and Holographic Dualities [18, 19, 20, 21, 22, 38, 39, 41, 42, 43]
   - 1.5 Noncommutative Geometry and Mathematical Physics [14, 35]
2. High Energy Phenomenology
   - 2.1 Particle Cosmology and Supersymmetric Unification Models [3, 4, 5, 6, 7, 44, 50, 51]
   - 2.2 Models in Higher-dimensional Space-time and Brane World [13, 15, 25, 26, 27, 28, 29, 30, 45, 46, 47]
3. Quantum Field Theory
   - 3.1 Lattice Gauge Theory [8, 9, 10, 11, 12]
   - 3.2 Fundamental Problems in Field Theory

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