

A. Standard Model of particle physics	41
B. Radiative corrections in an effective field theory	43
C. Supersymmetry (SUSY)	47
1. Minimal Supersymmetric Standard Model (MSSM)	47
2. Soft SUSY breaking Lagrangian	49
3. Next to MSSM (NMSSM)	50
4. Gravity mediated SUSY breaking	51
5. Gauge mediated SUSY breaking	52
6. Split SUSY	54
7. Renormalization group equations in the MSSM	54
D. F -and D -flat directions of MSSM	56
1. Non-renormalizable superpotential corrections	57
2. Spontaneous symmetry breaking and the physical degrees of freedom	60
E. $N = 1$ Supergravity (SUGRA)	61
1. SUSY generalization of one-loop effective potential	62
2. Inflaton-induced SUGRA corrections	63
3. No-scale SUGRA	64
F. (SUSY) Grand Unified Theories	65
1. $SU(5)$ and $SO(10)$ GUT	66
2. Symmetry breaking in SUSY GUT	69
G. Symmetry breaking and topological defects	71
1. Formation of cosmic defects during or after inflation in $4D$	71
2. Formation of cosmic (super)strings after brane inflation	73
3. Cosmological consequences of (topological) defects	73
IV. Models of inflation	76
A. What is the inflaton ?	76
B. Non-SUSY one-field models	77
1. Large field models	78
2. Small field models	80
C. Non-SUSY models involving several fields	83
1. Original hybrid inflation	83