

Contents

Preface to Los Alamos Science, Number 11, Summer/Fall 1984 viii

Introduction ix

Theoretical Framework

Scale and Dimension—From Animals to Quarks 2
by Geoffrey B. West

Fundamental Constants and the Rayleigh-Riabouchinsky Paradox 12

Particle Physics and the Standard Model 22
by Stuart Raby, Richard C. Slansky, and Geoffrey B. West

QCD on a Cray: The Masses of Elementary Particles 41
by Gerald Guralnik, Tony Warnock, and Charles Zemach

Lecture Notes—From Simple Field Theories to the Standard Model 54
by Richard C. Slansky

Toward a Unified Theory: An Essay on the Role of Supergravity in the Search for Unification 72
by Richard C. Slansky

Fields and Spins in Higher Dimensions 86

Supersymmetry at 100 GeV 98
by Stuart Raby

Supersymmetry in Quantum Mechanics 102

The Family Problem	114
<i>by T. Goldman and Michael Martin Nieto</i>	
Addendum: CP Violation in Heavy-Quark Systems	124

Experimental Developments

Experiments to Test Unification Schemes	128
<i>by Gary H. Sanders</i>	
An Experimentalist's View of the Standard Model	130
Addendum: An Experimental Update	149
The March toward Higher Energies	150
<i>by S. Peter Rosen</i>	
Addendum: The Next Step in Energy	156
LAMPF II and the High-Intensity Frontier	158
<i>by Henry A. Thiessen</i>	
The SSC—An Engineering Challenge	164
<i>by Mahlon T. Wilson</i>	
Science Underground—The Search for Rare Events	166
<i>by L. M. Simmons, Jr.</i>	

Personal Perspectives

Quarks and Quirks among Friends	180
<i>A round table on the history and future of particle physics with Peter A. Carruthers, Stuart Raby, Richard C. Slansky, Geoffrey B. West, and George Zweig</i>	
Index	196