CONTENTS

HYDRODYNAMIC DESCRIPTION OF A COLLISIONLESS PLASMA
by T. F. Volkov 1

References 20

COOPERATIVE PHENOMENA AND SHOCK WAVES IN COLLISIONLESS PLASMAS
by R. Z. Sagdeev 23

§ 1. Cooperative Phenomena in a Plasma 23
§ 2. Nonlinear Plasma Oscillations 38
§ 3. Shock Waves in Collisionless Plasmas 65

References 90

COULOMB COLLISIONS IN A FULLY IONIZED PLASMA
by D. V. Sivukhin 93

§ 1. Difficulties in the Theory of Coulomb Collisions 93
§ 2. Two-Particle Collisions 94
§ 3. Mean Rate of Change of Energy and Momentum of a Test Particle in a Plasma. Electrostatic Analogy 98
§ 4. Debye Shielding and Debye Radius 102
§ 5. Calculation of the Coulomb Logarithm 109
§ 6. Energy Exchange Between a Plasma and Test Particle. General Formulas 116
§ 7. Critical Velocity and Maximum Energy Transfer 120
§ 8. Relative Importance of the Ion and Electron Components in Exchange Between a Plasma and a Monoenergetic Beam of Noninteracting Particles 128
§ 9. Temperature Equalization in a Two-Component Plasma 133
§ 10. Momentum Change of a Test Particle Moving in a Plasma . . . 142
§ 11. Range of a Fast Ion in a Plasma 144
§ 12. Relaxation Times and Mean Free Paths 147
§ 13. Runaway Electrons 153
§ 14. Fokker-Planck Equation 159

§ 15. Relation Between the Diffusion Tensor, the Coefficient of Dynamical Friction, and the Distribution Function. The Kinetic Equation in the Landau Form 168
§ 16. Diffusion Tensor and Coefficient of Dynamical Friction for an Isotropic Distribution of Field Particles in Momentum Space 175
§ 17. Application of the Kinetic Equation in Energy Exchange Between Various Plasma Components 183
§ 18. Ion Loss by Collisions in Magnetic-Mirror Devices 186
§ 19. The Possibility of a Self-Sustaining Thermonuclear Reaction in a Mirror Device 202
§ 20. The Nature of the Singularities That Appear in Binary-Collision Theory and Techniques for Avoiding Them 221

References 240