

Contents

<i>Preface to the paperback edition</i>	ix
<i>Preface</i>	xi
PART I. FLOW AROUND BODIES MOVING IN A PLASMA	
9 A brief description of some theoretical problems and experiments	3
10 Some remarks about conditions at the boundaries of bodies moving in a plasma	10
10.1 Reflection of particles	11
10.2 Production of particles	12
10.3 Potential of a body	13
10.4 Electron temperature around a body	16
11 Disturbances of the plasma near fast-moving bodies ($V_b \gg v_i$)	19
11.1 Neutral approximation	19
11.2 Effect of an external static magnetic field	26
11.3 Effect of an electric field	29
12 Disturbances of the plasma near quasi-stationary bodies ($V_b \lesssim v_i$)	62
12.1 A small stationary body ($\rho_b \ll D_e, V_b = 0$)	62
12.2 A large stationary body ($\rho_b \gg D_e, V_b = 0$)	66
12.3 Slowly moving bodies ($V_b \simeq, <, \text{ or } \ll v_i; \rho_b \ll D_e \text{ or } \rho_b \gg D_e$)	69
13 Scattering of radio waves in the wake of a fast-moving body	75
14 Some remarks about the excitation of waves and plasma instability near a fast-moving body	87
14.1 The relationship between the perturbation of the electron density $\delta N_e(r)$ in the wake and ion-acoustic waves	88
14.2 The interaction between incident electromagnetic waves and the wake	89
14.3 Emission from the wake and plasma instability	91

PART 2. WAVES AND OSCILLATIONS IN THE NEAR-EARTH AND
INTERPLANETARY PLASMA

15	Introductory remarks	95
15.1	A general outline of the results of various experiments	96
15.2	Classification of the observed wave processes	98
15.3	Generation mechanisms for waves of different types	99
16	Results of studies of ELF waves	103
16.1	Hydromagnetic whistlers	103
16.2	Hydromagnetic waves (pulsations of the magnetic field) in the magnetosphere	108
16.3	Ion-cyclotron whistlers and waves	110
16.4	Hiss and chorus ELF radiation. Cutoff and intensification of emission as $n^2 \rightarrow 0$	116
17	Results of studies of VLF waves	123
17.1	Ion-acoustic waves; radiation at the proton gyrofrequency and its harmonics	123
17.2	Noise-like waves generated in the frequency range $\Omega_H < \omega < \omega_L$. Plasmaspheric hiss (PH)	133
17.3	Waves generated near the lower-hybrid frequency ω_L	138
17.4	Auroral hiss (AH). Saucer-shaped and V-shaped emissions	142
17.5	Trapping of VLF waves in the ionosphere and in the magnetosphere. Non-ducted waves	149
17.6	Broad-band emission of VLF waves. 'Lion's roar' LF waves	154
18	Results of studies of LF waves	159
18.1	Whistling atmospherics	159
18.2	Emissions generated at the boundary of the plasmasphere by means of radio waves (artificially stimulated emissions, ASE). Intensification of radio waves in the whistler mode	162
18.3	Hiss and chorus low-frequency waves	169
19	Results of studies of HF waves ($\omega \gtrsim \omega_H$, $\omega \gtrsim \omega_0$)	178
19.1	Resonances in the outer ionosphere (plasmasphere)	179
19.2	Waves in the magnetosphere, in the interplanetary medium, and in the solar wind	187
20	Energy densities of various types of waves	216
Appendix: Experimental and theoretical investigations of geomagnetic pulsations PC-1		224

Contents of volume 1

vii

<i>References</i>	249
<i>Additional references (added to paperback edition)</i>	268
<i>Author index</i>	270
<i>Subject index</i>	276

Contents of Volume 1

Preface to the paperback edition

Preface

Introduction

- 1 General remarks
- 2 General properties of the near-Earth and interplanetary plasma
- 3 Fundamental equations
- 4 Refractive index for a cold magnetoplasma
- 5 Refractive indexes and attenuation factors in a warm plasma
- 6 Growth rates for the different oscillation branches
- 7 Nonlinear effects in a plasma
- 8 Group velocity, trajectories, and trapping of electromagnetic waves in a magnetoplasma

Appendix to Chapter 8

References

Author index

Subject index