

TABLE OF CONTENTS

Foreword	i
Introduction	iii
Part 1. High-frequency Methods of Investigation of temperature and Concentration of Charged Particles	1
Chapter 1. Investigation of Concentration of Charged Particles in Plasma	1
1. 1 Concise Theory	1
1. 2 Simplest Examples	11
1. 3 The Concept of Tensor of Specific Inductive Capacitance of Plasma	18
1. 4 Taking the Plasma Pressure Into Account	22
1. 5 Taking the Effect of Collisions Into Account	29
1. 6 Microwave Methods of Measuring Concentration	37
1. 7 Resonator Method	48
Chapter 2. Measurement of Temperature	56
2. 1 General Remarks	56
2. 2 Tensor of Specific Inductive Capacitance Taking Kinetic Effects Into Account	58
2. 3 Absorption of Electromagnetic Waves in Plasma in the Presence of a Magnetic Field	68
2. 4 Experimental Determination of the Temperature as a Function of the Magnitude of Attenuation of Probing Signal	77
Chapter 3. Location of Plasma	86
3. 1 The Theory of the Problem	86
3. 2 Phase Method of Location	88
3. 3 Other Methods of Plasma Location	92

Part 2. Probe Methods of Investigation of Plasma Parameters	94	Part 5. Additional Methods of Probing the Concentration and Temperature	188
Chapter 4. Measurement of Concentration and Temperature with an Electric Probe	94	Conclusion	194
4.1 The Single Probe of Langmuir	94	Bibliography	197
4.2 Dual Electric Probe	104		
4.3 Limits of Applicability of Probe Measurements	110		
Chapter 5. Measurement of Variable Magnetic Fields in Plasma with a Magnetic Probe	114		
Part 3. Optical Methods of Investigating the Principal Plasma Parameters	118		
Chapter 6. General Comments and Concise Theory	118		
6.1 General Comments	118		
6.2 Stark Effect	120		
6.3 Doppler Broadening	133		
6.4 Other Mechanisms of Broadening	135		
6.5 Correlation Between Spectrum Line Profile and Plasma Parameters	136		
6.6 Intensity of Spectrum Lines and Measurements of Electron Temperatures	141		
Chapter 7. Continuous Radiation of Plasma (Continuum)	146		
7.1 Bremsstrahlung	146		
7.2 Recombination Continuum	149		
7.3 Experimental Applications	151		
Chapter 8. Optical Chronography of Plasma	154		
8.1 Mechanical Scanning Systems	154		
8.2 Systems with Photoelectric Recording	159		
8.3 Systems with Electron-Optical Converters	161		
Part 4. Radio-Frequency Radiation of Plasma and Determination of Concentration and Temperature	165		
Chapter 9. Concise Theory	165		
9.1 Thermal Radiation of Plasma	165		
9.2 Radiation of Plasma Which Is Not in Thermal Equilibrium	174		
Chapter 10. Experimental Determination of Plasma Parameters	178		