Contents

0.	Introduction		
1.	Bound States of Charged Particles	1	
	1.1. Definition and General Properties of Bound States	1 4 8	
2.	Thermodynamics and Elementary Statistics of Charged Particle Systems	15	
	 2.1. The Electron Gas Model 2.2. Ionization Equilibrium of Ideal Particles 2.3. Saha Equation for Nonideal Plasmas 2.4. Saha Equation for Screened Electrons. Mott Transition 2.5. Dense Hydrogen and Alkali Plasmas 2.6. Dense Plasmas in Solids 	15 25 34 37 40 47	
3.	Statistical Mechanics of Systems with Bound States	55	
	 Bound States in many Particle Systems	55 56 60 63 66 69	
	Parameter	71 74 76	
4.	Statistical Foundation of the Mass Action Law	79	
	 4.1. Comparison of Fugacity and Density Expansions	79 81 82 84	
5.	Statistical Mechanics of Charged many Body Systems	87	
	5.1. Special Properties of Charged many Body Systems. Jost Function Method for the Coulomb Potential.	87	

Contents

	5.2.	The second Virial Coefficient for Systems of Charged Particles 91
	5.3.	Screening
	5.4.	Ladder Approximation for the Function Π . Effective two-Particle Wave
		Equations
	5.5.	Screened second Virial Coefficient
	5.6 .	Analytic Expressions for the Screened second Virial Coefficient 107
		5.6.1. Hartree Contribution
		5.6.2. Hartree-Fock Contribution
		5.6.3. Exchange Term of order e^4
		5.6.4. Direct Interaction of Order e^6
		5.6.5. Exchange Term of Order e ⁶
		5.6.6. Final Result
	5.7.	Diagrams of Higher Orders (Reducible Diagrams)
	5.8.	Totally Screened second Virial Coefficient
6.	Quan	tumstatistical Results for the Thermodynamic Functions
	6.1.	The Fugacity Expansion of the Pressure
	6.2.	Statistical Foundation of Saha Equations
	6.3.	Problems of Stability and Phase Transitions
	6.4.	Chemical Potential and Coexistence of Phases
7	Data	150
1.	L'ete	Tences
8.	Subj	ect Index