

PRINCIPIA MATHEMATICA PHYSICA ATOMIKA

James M. Kingsley III

Berkeley, California

Copyright Registration #
TXu-173-386 September 24, 1984
TXu 1-119-093 August 13, 2003
TXu 1-581-563 October 16, 2007

Table of Contents Principia

Chapter 1.	On the Absolute Constancy of the Speed of Light	p 1
Chapter 2.	Coordinate Transforms	p 34
Chapter 3.	Mathematics of the Solid Mass Atom- The Atomic Field	p 49
Chapter 4.	The Kinetic Theory of Solids	p 65
Chapter 5.	Chemical Bond Energy, Specific Heats, C_p and C_v	p 90
Chapter 6.	The Solid Mass Photon and Atomic Spectra	p 104
Chapter 7.	Electrostatics, Electric Currents, Electronics, Permanent Magnets, Without Electrons	p 162
Chapter 8.	Particle Accelerators and $\underline{v} \times \underline{B}$ Effects	p 245
Chapter 9.	Rutherford Scattering, Radioactive Decay, Subatomic Particles	p 260
Chapter 10.	The Hydrogen Bomb	p 281
Chapter 11.	Solar Energy, Solar and Planetary Interiors, The Tides	p 291
Chapter 12.	Fluid Turbulence, Water Clathrates and Shock Waves	p 344
Chapter 13.	Infinite Universe Cosmology	p 376

Amplified Table of Contents

Chapter 1.	On the Absolute Constancy of the Speed of Light	
1.	Prologue	p 1
2.	The I and II Postulates of Special Relativity	p 1
3.	Evaluation of β , γ , δ	p 7
4.	The Michelson-Morley Experiment	p 8
5.	In Frame and Cross Frame Simultaneity	p 12
6.	Time Dependent, Observer Dependent, Truth Tables	p 16
7.	Derivation of α	p 20
8.	The Galilean Transform	p 25
9.	Vector Additivity of the Velocity of Light	p 26
10.	Critique of the Derivation of the Lorentz Transform	p 27
11.	The Consistency of the Postulates of Special Relativity	p 28
12.	Statement of Results	p 29
13.	Mathematical Conjectures	p 29
14.	Suggested Experiments	p 30
15.	Appendix 1A – Transitivity of Instant	p 31
16.	References	p 33

Chapter 2. Coordinate Transforms

1.	Moving Point Versus Stationary Point- Accelerating Point as Seen from S	p 34
2.	Accelerating Point as Seen from S'	p 36
3.	Inertial Frame Transforms-Newton's Transform	p 37
4.	Accelerating Frame Transforms	p 39
5.	Operational Definition of Inertial Mass	p 41

6. Operational Definition of Gravitational Mass	p 43
7. The Lagrange and Hamilton Equations	p 44
8. Newton's Second Law	p 46
9. References	p 48

Chapter 3. Mathematics of the Solid Mass Atom- The Atomic Field

1. Postulate 3.1 – The Potential Energy of Two Atoms, the Atomic Field of One Atom	p 49
2. Evaluation of the Atomic Field	p 51
3. Postulate 3.2- Elastic collisions:	p 52
4. Postulate 3.3 – Energy Equilibrium Condition	p 55
5. Contact Pressure $P_C(h)$ and Field Generated Pressure $P_\Psi(h)$	p 58
6. The Virial Theorem and Time Dependent T and V	p 59
7. Classical Binding Energy	p 60
8. Evaluation of H and the Binding Energy of the Elements	p 62
9. Evaluation of U_{rms}	p 63
10. Explosive Property of the Solid Mass Atom	p 63
11. Reference	p 64

Chapter 4. The Kinetic Theory of Solids

1. Determination of the Radius of the Atom r_0	p 65
2. Determination of $R_0(T)$ with $P_e=1$ atms.	p 67
3. Equation of State for the Transition Elements	p 69
4. Incremental Pressure Difference $P_T(x,t)$	p 72
5. Speed of Sound Formula for the Transition Metals	p 76
6. The Bulk Modulus and the Speed of Sound in the Transition Metals	p 79
7. Average Contact time $\overline{\Delta t}_C$	p 82
8. Thermal Conductivity	p 83
9. Appendix 4A	p 89
10. References	p 89

Chapter 5. Chemical Bond Energy, Specific Heats, C_p and C_v

1. Chemical Bond Energy $\Phi_p(r_1)$	p 90
2. Specific Heat at Constant Pressure C_p	p 91
3. Specific Heat at Constant Pressure C_p as $T \rightarrow 0^+ \text{ } ^\circ\text{K}$	p 97
4. Resonant Chemical Bonding	p 98
5. Exothermic and Endothermic Chemical Reactions	p 102
6. Appendix 5A	p 102
7. Appendix 5B	p 102

Chapter 6. The Solid Mass Photon and Atomic Spectra

1. The Solid Mass Photon	p 104
2. $U_{rms}^2(r) = 2[C_1 - \Psi(r)] \geq 0$	p 105
3. Photon Binding Energy	p 106
4. Newton's 2 nd Law Rewritten	p 108
5. Newton's Laws Rewritten for Two Solid Mass Atoms Colliding Elastically	p 110
6. Creation of a Solid Mass Photon- Energetics of a Tungsten Filament Light Bulb	p 116
7. Creation of Line Spectrum from Solid Mass Photons	p 130
8. Photon Transmission Through a Gas, Liquid or Solid	p 136
9. Optical Pumping, Stimulated Emission, Laser Light	p 147
10. Photon Reflection from a Mirror	p 151
11. Photon Interaction with a Spectral Grating	p 153
12. Photon Interaction with a Glass Plate and with a Glass Prism	p 156
13. Black Body Radiation	p 160
14. Appendix 6A	p 165
15. Appendix 6B	p 166
16. Appendix 6C	p 166
17. References	p 166

Chapter 7. Electrostatics, Electric Currents, Electronics, Permanent Magnets, Without Electrons

1. Gold Foil Repulsion and Attraction	p 162
2. Repulsion	p 162
3. Attraction	p 172
4. Millikan Oil Drop Experiment	p 174
5. Charge Separation	p 177
6. Electric Power, Voltage, Amperage, Resistance	p 178
7. High Voltage Electric Current	p 182
8. Application of Power Formula	p 187
9. High Voltage Power Capacitor	p 188
10. Catastrophic Capacitor Failure	p 191
11. Force Between Two Parallel Current Carrying Wires	p 194
12. The Photoelectric effect	p 197
13. The Triode Vacuum Tube	p 200
14. L C R Circuit	p 208
15. PN Junction Diode and PNP Transistor	p 217
16. Permanent Magnet	p 223
17. Permanent Magnets, Questions and Answers	p 232
18. Appendix 7A-Water Droplets	p 240
19. Appendix 7B-Atomic Radial Oscillations	p 242
20. Appendix 7C Pressure Formula	p 242
20. References	p 242

Chapter 8. Particle Accelerators and $\vec{v} \times \vec{B}$ Effects.

- | | |
|--------------------------------------|-------|
| 1. The Cyclotron | p 245 |
| 2. Beam Current | p 252 |
| 3. $\vec{v} \times \vec{B}$ Effects. | p 253 |
| 4. Appendix A | p 259 |
| 5. Reference | p 259 |

Chapter 9. Rutherford Scattering, Radioactive Decay,
Very Energetic Atomic Collisions

- | | |
|--|-------|
| 1. Rutherford Scattering | p 260 |
| 2. Radioactive Decay | p 268 |
| 3. Very Energetic Atomic Collisions and the Higgs Particle | p 275 |
| 4. References | p 280 |

Chapter 10. The Hydrogen Bomb

- | | |
|-------------------------------|-------|
| 1. Introduction | p 281 |
| 2. Explosion Model | p 281 |
| 3. Creation of Bomb Material | p 282 |
| 4. Atom Compression Revisited | p 285 |
| 5. Creation of an Explosion | p 285 |
| 6. Appendix 10A | p 289 |

Chapter 11. Stellar Energy, Stellar and Planetary Interiors

- | | |
|---|-------|
| 1. Stellar Energy | p 291 |
| 2. Temperature and Density of the Sun as a Function of R | p 296 |
| 3. The Solar Atmosphere and Corona | p 299 |
| 4. Generation of Optical and x-ray Radiation | p 300 |
| 5. Cause of Solar Eruptions | p 306 |
| 6. Planetary Capture by the Sun | p 312 |
| 7. Earth's Temperature as a Function of Depth | p 315 |
| 8. Lunar Caused Deformation of the Geoid | p 317 |
| 9. The Lunar Oceanic Tide | p 330 |
| 10. Mount St. Helens Events | p 333 |
| 11. Earth Quakes and Mountain Uplift | p 334 |
| 12. The Creation of Shock Waves in Solids, Liquids and Gases | p 339 |
| 13. Creation of Large Mass Atoms from Small Mass Atoms near the Earth's Surface | p 342 |
| 14. Appendix 11A | p 343 |

Chapter 12. Turbulence, Water Clathrates, and Shock Waves

- | | |
|--|--------|
| 1. Mathematical Theory of Turbulence and the $(\underline{U} \cdot \nabla) \underline{U}$ Term | p. 344 |
| 2. Water Molecule Dimension | p. 346 |
| 3. Dimensions of Water Clathrate | p. 348 |
| 4. Rewriting the Navier-Stokes Equation | p. 355 |
| 5. Formation of Micelle Water Droplets, Mists, Fogs and Clouds in Earth's Atmosphere | p. 358 |
| 6. Absolute Humidity | p. 362 |
| 7. Water to Steam: The Latent Heat of Vaporization | P. 365 |
| 8. Turbulent Flow in Water | p. 367 |
| 9. Creation of Vortices and Vortex-Turbulent Flow in Air | p. 371 |
| 10. Shock Wave In Earth's Atmosphere | p. 376 |
| 11. Evaporation of Water at S.T.P. | p. 382 |
| 12. Surface Tension | p. 385 |
| 13. Reference | p. 386 |

Chapter 13. Infinite Universe

- | | |
|-------------------------------------|--------|
| 1. Infinite Universe: An Exposition | p. 387 |
|-------------------------------------|--------|