

Memorandum M-2760

Page 1 of 3

Digital Computer Laboratory
 Massachusetts Institute of Technology
 Cambridge, Massachusetts

SUBJECT: GROUP 63 SEMINAR ON MAGNETISM: INTRODUCTION

To: Group 63 Staff

From: Arthur L. Loeb

Date: June 23, 1953

During the academic year 1952-53 a series of seminars on magnetism was given by Arthur L. Loeb. Notes were taken by Norman Menyuk, and from these was compiled the set of "M" Memoranda listed on page 3.

The seminar was divided into three main portions, with the various topics (arabic numerals) distributed over the memoranda (roman numerals) roughly as indicated below:

A. Classical Magnetism and Qualitative Discussion of the Solid State

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|---|-----------|
| 1. Electromagnetic waves and Maxwell's Equations | (I-III) |
| 2. Paramagnetism | (IV-V) |
| 3. Molecular field | (VI) |
| 4. Ferromagnetic properties | (VII-IX) |
| 5. Harmonic oscillator, including damping force | (X) |
| 6. Resonance | (XI) |
| 7. Coupled harmonic oscillators; normal modes of motion and perturbation methods | (XII-XIV) |
| 8. Structure of metals | (XV-XVII) |
| 9. Pauli exclusion principle and statistical methods; Fermi and exchange energies | (XVIII) |

B. Principles of Quantum Mechanics; Quantitative Explanation of Fermi and Exchange Energies

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|--|---------------|
| 1. Wave nature of particles; the uncertainty principle in classical optics | (IX) |
| 2. Schroedinger's hypotheses | (XX) |
| 3. Stationary states; eigenfunction | (XXI-XXII) |
| 4. Orthonormality | (XXIII-XXIV) |
| 5. Applications | (XXV-XXVII) |
| 6. Perturbation theory | (XXVIII-XXIX) |

- 7. Degenerate states (XXVI)
- 8. Radiation (XXVII)
- 9. Many-electron systems; electron spin; Pauli exclusion principle (XXVIII-XXXI)
- 10. Statistical Mechanics; collective model of magnetism (XXXI-XXXV)

C. Review of Some Recent Fundamental Research in Magnetism

- 1. The Zener atomistic model (XXXV-XLIII)
- 2. The collective model; Hartree's self-consistent field method (XLIII-XLIV)
- 3. Matrix mechanics; spin operators (XLV)
- 4. Antiferromagnetism and ferrimagnetism (XLVI-LV)

Dr. H. J. Williams of Bell Laboratories and Professor Nicolaas Bloembergen of Harvard University appeared as guest speakers. Phillip K. Baltzer, Dudley A. Buck, John B. Goodenough, and Norman Menyuk at various times contributed special reports on meetings and publications.

Signed


Arthur L. Loeb

Approved



David R. Brown

ALL/jk

cc: Group 62 (25)

INTRODUCTION

Group 63 Seminar on Magnetism

<u>Lecture</u>	<u>Memorandum</u>	<u>Lecture</u>	<u>Memorandum</u>
I	M-1673	XXXI	M-1841
II	M-1675	XXXII	M-1850
III	M-1679	XXXIII	M-1853
IV	M-1687	XXXIV	M-1854
V	M-1688	XXXV	M-1902
VI	M-1689	XXXVI	M-1908
VII	M-1700	XXXVII	M-1910
VIII	M-1708	XXXVIII	M-1914
IX	M-1714	XXXIX	M-1917
X	M-1724	XL	M-1918
XI	M-1720	XLI	M-1931
XII	M-1721	XLII	M-1926
XIII	M-1723	XLIII	M-1933
XIV	M-1747	XLIV	M-1934
XV	M-1749	XLV	M-1950
XVI	M-1751	XLVI	M-1951
XVII	M-1754	XLVII	M-1960
XVIII	M-1772	XLVIII	M-1959
XIX	M-1760	XLIX	M-1980
XX	M-1763	L	M-2116
XXI	M-1764	LI	M-2138
XXII	M-1788	LII	M-2207
XXIII	M-1795	LIII	M-2245
XXIV	M-1798	LIV	M-2234
XXV	M-1809	LV	M-2261
XXVI	M-1821		
XXVII	M-1822		
XXVIII	M-1824		
XXIX	M-1831		
XXX	M-1836		
		<u>Appendices</u>	
		I	M-1718
		II	M-1697
		III	M-1752
		IV	M-1801
		V	M-1802
		VI	M-1971
		VII	M-2159