

# SIMON FRASER UNIVERSITY

S. 2842

## MEMORANDUM

Registrar

From J. F. Cochran, Acting Head

Department of Physics

Subject Special Topics Courses - Physics Date October 27, 1969

14733-PC

Enclosed please find short descriptions of the new special topics courses in physics which were prepared in accordance with the wishes of the Executive Committee of the Senate Committee on Graduate Studies. Would you please be kind enough to present these descriptions to the Senate Committee on Graduate Studies.

*J. F. Cochran/ra*

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Enclosure

## Special Topics Courses

### PHYSICS

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827-2 Quantum Electrodynamics

Quantum theory of the electromagnetic field.

831-2 Low Temperature Physics

A survey of experimental techniques and physical phenomena associated with low temperatures.

832-2 Electron Diffraction and Electron Microscopy

Theory and applications of electron diffraction and electron microscopy with particular reference to crystalline materials.

833-2 Recovery of Signals from Noise

Sources of noise in experimental situations and the design of apparatus to maximize signal to noise.

854-2 Topics in Laser Applications to Molecular Physics and Spectroscopy

Uses of lasers in spectroscopy of atoms, molecules and crystals. A discussion of linear scattering including Raman and Brillouin. Non-linear optics including stimulated scattering.

855-2 Laser Physics

Amplification of radiation and laser threshold conditions; resonant optical cavities; types of lasers; applications of lasers to research and technology.

867-2 Magnetism in Metals and Alloys

Physics of magnetism, magnetic properties of materials, magnetic interactions, ordering, spin waves, survey of magnetism in metals and alloys.

868-2 Solid State Devices

The Physics of solid state devices, particularly semi-conducting devices whose operation is based on transport and optical properties.

869-2 Thermoelectricity

A detailed discussion of processes such as electron diffusion, phonon drag and anomalous magnetic scattering which cause the observed thermoelectric properties of metals and semiconductors.

874-2 Reactor Physics

The physical principles involved in the design and operation of a nuclear reactor.

875-2 Neutron Scattering

The experimental and theoretical principles of neutron diffraction, with application to the study of magnetic materials.

884-2 Application of Group Theory to Physics

Elements of group theory, matrix representations, the Clebsch-Gordan series, applications of finite and continuous groups (such as point symmetries, the rotation group) to problems in atomic and solid state physics.

885-2 Quantum Fluids

Theoretical and experimental treatment of superconductivity, liquid He, and  $\text{He}^3\text{-He}^4$  mixtures.

886-2 Fermi Surfaces

A discussion of the Fermi surface in metals and its relation to transport, thermal, and optical properties.

887-2 Many Body Problems: Green's Function Techniques

Feynman diagrams, Green's functions for zero and finite temperatures, the interacting electron gas, quasi-particles, BCS pairing-force theory of superconductivity and nuclei.

888-2    Advanced Mathematical Methods for Physicists

Integral equations, variational methods and eigenvalue problems, dispersion theory, spectral representation of operators, fundamental properties of special functions.

889-2    Topics in Biophysics

The physical principles underlying basic biological phenomena. Application of experimental physical techniques to the study of biological systems.

890-2    Transport Theory

Boltzmann equation, density matrix; linear response theory, Kubo formula, applications.

891-2    Electron-Phonon Interaction

The effects of lattice vibrations upon electronic properties of solids.

892-2    Fermi Liquid Theory

The dependence of macroscopic properties of a system of Fermi particles in terms of Landau's phenomenological theory.