

THE INSTITUTE OF PHYSICS

AND

THE PHYSICAL SOCIETY

HANDBOOK

OF

SCIENTIFIC INSTRUMENTS

AND APPARATUS

1963 EXHIBITION

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**HANDBOOK OF
SCIENTIFIC INSTRUMENTS
AND APPARATUS
1963**

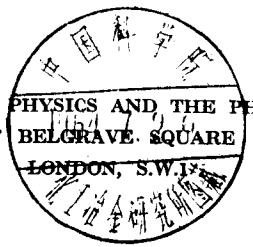
**47th ANNUAL EXHIBITION
OF
THE INSTITUTE OF PHYSICS AND
THE PHYSICAL SOCIETY**

in

the OLD and NEW HALLS of the
ROYAL HORTICULTURAL SOCIETY
WESTMINSTER, LONDON

Monday, 14th January to Thursday, 17th January, 1963
10 a.m. to 7 p.m. each day
(Members and Press only, 10 a.m. to 1 p.m. Tuesday, 15th January)
Admission by ticket only

THE INSTITUTE OF PHYSICS AND THE PHYSICAL SOCIETY
47 BELGRAVE SQUARE
LONDON, S.W.1



1964

The dates of the 1964 Exhibition are expected to be
Monday, 6th January to Thursday, 9th January

FOREWORD

The Council of the Institute and Society has, through its Exhibitions Committee, modified the system for the selection of exhibits at this, the 47th exhibition in the series. The purpose has been to further the policy of "preserving and enhancing the unique nature of these annual exhibitions as scientific occasions rather than as opportunities for displays of ordinary commercial products."

Each potential exhibitor has been invited to submit a limited number of individual offers, from which a selection has been made by the Committee with the assistance of panels of expert referees. As a result visitors will notice a reduction in the total number of exhibits on display, and the area occupied by each firm, but it is hoped that all of these exhibits will be of special interest to physicists, and that it will be possible to move round the Exhibition more easily.

It will also be noticed that although only one firm has been invited to represent collectively the publishers of scientific and technical books this year, as opposed to twenty in 1962, it has been possible to make a net increase in the number of exhibiting firms from 111 to 119.

It is the intention of the Council that the Exhibition should continue to be a meeting place for those engaged in research and development. With this in view universities, colleges and government supported research departments are particularly welcomed. The Council is already satisfied that its policy is warmly supported by exhibitors and is confident that this is the most useful contribution to the British instrument industry that the Institute and Society can make.

A. H. Wilson

President

Stand Nos. 1-55 in the Royal Horticultural Society's Old Hall.

Stand Nos. 56-144 in the Royal Horticultural Society's New Hall.

Enquiries concerning instruments described in this Handbook should be made direct to the firms concerned and should not be sent to The Institute of Physics and The Physical Society offices.

Every effort will be made to ensure that all exhibits described in this Handbook will be available for inspection at the Exhibition, but it is not possible for the Institute and Society to guarantee this.

Peak attendance during the Exhibition is between 2 and 4 p.m., and visitors are requested to avoid this time if possible.



LECTURES

Tuesday, 15th January at 3.0 p.m.

OPTICAL RESEARCH AND THE SOLID STATE LASER

Dr. J. M. Burch

National Physical Laboratory

It is less than three years since the first optical maser or laser was brought into operation, and spectacular progress continues to be made. Solid state devices have not so far achieved the same spectral purity as their gaseous counterparts, but their performance as sources of giant light pulses has made them ideal for experiments on non-linear optical effects, such as harmonic generation, which depend on quadratic or higher powers of the light intensity.

The coherent output of an optical maser is generated by much the same 'feedback' principle as in a radio oscillator, but the dimensions of the optical resonator are such that it is a three-dimensional momentum or mode-pattern whose build-up must be considered. Comparing coherent light from a maser with ordinary light from a thermal source, we find that the advantage of the former depends very much on the type of experiment, but can be twelve orders of magnitude where both brightness and spectral purity are important.

One of the main aims of present work is to find new laser materials that can operate at new wavelengths and with lower pumping power, but considerable attention is also being given to securing more nearly optimum performance from an existing material. Three of the main present limitations are divergence of the beam caused by variations in refractive index, frequency drift caused by the optical pump, and 'spiking' or instability of the light output. Recent progress towards solving these problems is reviewed.

Wednesday, 16th January at 5.45 p.m.

APPLICATIONS OF ULTRASONICS

Mr. C. F. Brockelsby

Mullard Research Laboratories

The history of ultrasonics will be outlined to provide a background for the discussion of present-day applications. These can be classified as processing, testing and communications.

In processing applications, ultrasonic vibration at high power densities is used to produce a physical or chemical change in a material. In liquids, the effective agent is often cavitation, which causes emulsification and dispersion, useful for cleaning and atomization.

Focused ultrasound is used for surgery. Echo sounding techniques are used for testing materials as well as at sea. They have recently been applied in medical diagnosis. Ultrasonography by image-forming methods may be an alternative method. The high frequency elastic properties of a material can be measured with great precision and give information about its structure.

The most important 'communications' application is in ultrasonic delay lines, which are useful in radar and data-handling systems.

Thursday, 17th January at 5.45 p.m.

THE EXPERIMENTAL INVESTIGATION OF SPACE

Mr. J. A. Ratcliffe, C.B.E., F.R.S.

Radio Research Station

The lecturer will discuss the experiments which have been and are being made, with the help of rockets and artificial satellites, to investigate phenomena outside the earth. These phenomena will be discussed in order of increasing height. It will be explained that the first objective is to get, effectively, outside the earth's atmosphere for the purpose of examining those solar radiations which are incapable of penetrating it. The next is to examine the nature and movements of the very tenuous outer atmosphere. And finally the objective is to explore interplanetary space and the phenomena which occur between the sun and the earth.

Methods of experimenting will be described in outline, and some typical results will be discussed.

No special tickets are required for admission to the lectures.

CRAFTSMANSHIP COMPETITION
in
SCIENTIFIC INSTRUMENTS AND APPARATUS

With the object of encouraging craftsmanship and draughtsmanship in the scientific instrument industry, a competition mainly for young workers of either sex is held each year in connection with the Institute and Society's annual Exhibition.

Most of the entries will be on show in the vestibule of the New Hall.

The Prizegiving will be held at 3 p.m. on Tuesday, 15th January, at the Institute and Society's Headquarters at 47 Belgrave Square, London S.W.1.

The classes under which work may be offered are :

I. (i) Scientific Instrument or Component together with a Complete Working Drawing.

(a) Junior Grade

(b) Junior Grade for work done wholly in the competitors' own time.

(c) Senior Grade

(ii) Silvanus P. Thompson Prize for the best entry of the combined classes

(i) (a), (b) and (c).

II. Scientific Instruments and Components.

(a) Junior Grade

(b) Senior Grade

(c) Advanced Grade

III. Optical Components and Systems.

IV. Blown-glass and Silica Ware.

(a) Junior Grade

(b) Senior Grade

V. Instructional Items, Sections of Instruments, Functional Scale Models of Scientific Interest and Patterns.

(a) Work done wholly in competitor's own time (combined Junior and Senior Grade).

(b) Work not done wholly in competitor's own time (combined Junior and Senior Grade).

VI. Microwave Components.

(a) Junior Grade

(b) Senior Grade

VII. Electronic Circuitry.

(a) Junior Grade

(b) Senior Grade

VIII. Research Items.

(a) Combined Junior and Senior Grade

(b) Advanced Grade (no age limit)

Age Limits :

The age ranges covered by the grades shown are :

Junior — Competitors under 19 years on 31st December immediately preceding the Exhibition.

Senior — Competitors 19 years and over but under 22 on 31 December.

Advanced — Competitors 22 years and over; there is no upper age limit.

In Class III, where no age grade is given, competitors must be under 22 on 31st December.

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