### MEETINGS

### Fusion and plasmas

A series of lectures on plasmas and controlled fusion will form the program of a conference to be held October 11 to 13 at the University of Michigan.

The speakers and their topics will be: Sanborn Brown (experiments on the interaction of radiation with plasmas), Harold Furth (theory of thermonuclear processes), Norman Rostoker (kinetic theory of plasmas), and Arthur Snell (a survey of controlled-fusion research).

Additional details can be obtained from R. K. Osborn, Department of Nuclear Engineering, University of Michigan, Ann Arbor, Mich.

### Medium-energy physics

The National Research Council of Canada and the University of Manitoba are sponsoring a conference on medium-energy physics on October 14 and 15 in Winnipeg. The conference marks the formal opening of the laboratory housing the University's new 50-MeV sector-focused cyclotron that went into active use last spring. One session of the meeting will be devoted to new developments in cyclotrons and associated equipment, with the remainder on nuclear physics in the medium-energy range.

Further information can be requested from K. G. Standing, Allen Physics Laboratory, University of Manitoba, Winnipeg, Manitoba, Canada.

### Plasmas

The seventh annual meeting of the American Physical Society's Division of Plasma Physics will be held November 8 to 11 at the San Francisco Hilton in San Francisco, Local sponsors will be the Lawrence Radiation Laboratory, University of California, and the Institute for Plasma Research, Stanford University. The first day's program will include sessions cosponsored by the American Astronomical Society, and will be con-

cerned with the plasma phenomena of astrophysics.

Two-hundred-word abstracts, prepared in accordance with the instructions set forth in any recent Bulletin of The American Physical Society, should be sent in duplicate by October 1 to Dr. Richard F. Post, Lawrence Radiation Laboratory, University of California, PO Box 808, Livermore, Calif. 94551.

### Radiation and matter

An interdisciplinary symposium on radiative energy transfer will be held February 24 to 26, 1966, in Philadelphia. Sponsored by the Office of Naval Research, the Space Sciences Laboratory of the General Electric Company, the Joint Institute of Laboratory Astrophysics, and the National Bureau of Standards, the symposium is expected to be of special interest to physicists, astrophysicists, and aerodynamicists.

Papers are solicited by the sponsors in the proposed session areas of space and atmospheric physics, stellar aerodynamics, plasmas, oceanography, atmospheric entry and reentry, and solid transparent media.

Abstracts and applications to attend must be sent by October 15 to James J. Welsh, Space Sciences Laboratory, General Electric Company, Valley Forge, Pa.

### Radiation detectors

The tenth biennial scintillation and semiconductor counter symposium will take place March 2 to 4, 1966, at the Shoreham Hotel in Washington, D.C., under the auspices of the Atomic Energy Commission, the Institute of Electrical and Electronics Engineers, and the National Bureau of Standards.

There will be six technical sessions: detector applications; scintillation counters, scintillators, and photomultipliers; semiconductor detectors; semiconductor detectors and associ-



# MEASURE A NANOVOLT!

The new Keithley 148 Nanovoltmeter provides the most dc voltage sensitivity, highest stability and lowest noise of any commercially available voltmeter. The 148 has 1% accuracy at the output terminals, input impedance of 1000 ohms on the 10-1 volt range rising to 1 megohm on the 10-2 volt range, front panel zero suppression and amplifier gains up to 101.

Applications include measuring outputs of thermocouples; measuring super conductivity in the 10-4 ohm range; conducting Hall Effect studies and use as a null detector.

- 10 nanovolts (10-v) full scale sensitivity
- 10 nanovolts per 24 hours stability
- 1 nanovolt noise, peak-to-peak
- 3000:1 line frequency rejection
- line or rechargeable batteries

Send for New 148 Engineering Note

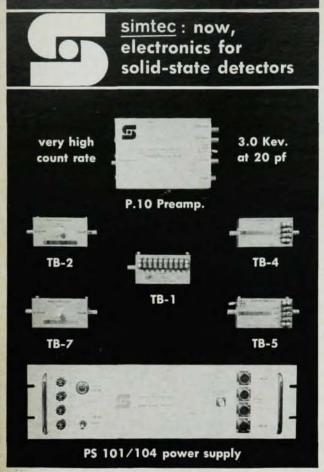
#### other microvoltmeters

Model 149 0.1 µv sensitivity \$895 Model 150A 1 µv sensitivity \$750 Model 151 100 µv sensitivity \$420



KEITHLEY
INSTRUMENTS

12415 Euclid Avenue . Cleveland 6, Ohio



To fully exploit the high resolution capabilities of silicon and germanium radia-tion detectors a stable, low noise preamplifier is needed.

Some manufacturers will tell you how good their preamplifiers are when operated with zero external input capacitance; in other words, they extol the performance of their preamplifier when measured with no detector at the input. This seems a bit

In practice, a detector plus cables and connectors represents an input capacity seldom less than 20 pf; for thin detectors and for those with larger areas, capacities can exceed 100 pf. It is under these conditions — with an operating detector connected to the input — that we are particularly proud of the performance of our preamplifier.

In order to assist everyone to own a Simtec P-10 preamplifier we have designed a superlative line of electronics, enabling you to introduce the P-10 into your laboratory at minimum possible cost. Here are the details:

P-10 PREAMPLIFIER: Rise time — 20 nsec. Count rate — at 4 X 10 counts per second of 5 Mev alpha particles there is less than 1% change in resolution. Noise FWHM guaranteed less than 3.0 kev at 20 pf, 4.1 kev at 50 pf, 5.9 kev at 100 pf (germanium); 3.8 kev at 20 pf, 5.2 kev at 50 pf, 7.4 kev at 100 pf (silicon).

PS-101/104 POWER SUPPLIES: Provides power for 1 or 4 P-10's respectively. Output voltages automatically applied in proper sequence for long life of pream-plifier input tube. Excellent surge suppression. Thermally protected.

Prices \$595/5953

TB-1 POWER SUPPLY TRANSFER BOX: Recommended if you wish to use your Price \$27

TB-2 HIGH VOLTAGE BIAS TRANSFER BOX: Allows a detector to be used with bias up to 6000 V without danger to preamplifier input tube.

TB-4 TIME CONSTANT BOX: Shapes the signal pulse. Time constants available from 0.1 $\mu$ S to 2.0 $\mu$ S. Gain constant to  $\pm$  1% on all ranges. Price \$65 Price \$65 TB-5 INVERTER AMPLIFIER: Offers amplification of 2.5% and 10% and signal inversion. Output saturation is 10 volts peak. Excellent linearity. Price \$150

TB-7 ROOM TEMPERATURE BIAS TRANSFER BOX: Permits large detectors to be used at room temperature without shorting out the 1000 Megahm series bias resistor in the P-10.

M-201/204: Complete power supply plus main amplifier system. Includes pulse shaping, amplification and voltages for P-10. Available for one or four detector/ analyzer channels. Prices \$837/\$1921

As can be seen from the above listing, Simtec's electronics will bridge the entire gap from detector to analyzer. Alternatively you can replace your present preamplifier only and retain some or all of the less critical units in your present instal-

For further information write to:



## the journal of vacuum science and technology

Official publication of the American Vacuum Society

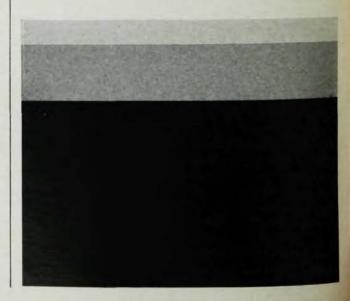
A medium for the publication of original research dealing with physical phenomena occurring at low pressure.

The term vacuum is used generically and includes the entire pressure range below atmospheric. Coverage falls into two general areas: contributions to the basic scientific understanding of physical phenomena relating to or observed at low pressures, and papers describing substantive advances in vacuum technology.

The Journal of Vacuum Science and Technology is published bimonthly. Subscription price: Volume 2, 1965, \$14 domestic and \$15 foreign.

Please address orders and inquiries to: Department AP American Institute of Physics 335 East 45 Street, New York, N. Y. 10017

Please enter	subscription(s)
Name	
Address	



ated circuitry; detector logic, circuits, and data processing; and spark chambers and track imaging.

The first session will consist entirely of invited papers, but contributions are solicited for the remaining five sessions on subjects dealing with theoretical and practical aspects of newer components, equipment, and techniques. Abstracts must be sent by December 1 to W. A. Higinbotham, Brookhaven National Laboratory, Upton, Long Island, N.Y. 11973.

Further information can be obtained from G. A. Morton, RCA Laboratories, Princeton, N.J. 08540.

### Phonons

The Institute of Physics and the Faysical Society is arranging a conference concerning both theoretical and experimental work on phonons, to be held April 6 and 7, 1966, at the University of Edinburgh.

The technical program will cover electron-phonon, neutron-phonon, photon-phonon, and phonon-phonon interactions; the interpretation of phonon dispersion curves, phonons in imperfect crystals and in liquids, etc. It is also hoped that it will be possible to include a few short contributions on such closely allied topics as spin waves.

Contributed papers should be of about 15 minutes duration, and abstracts (300 words) should be sent by February 1 to Prof. W. Cochran, Department of Natural Philosophy, The University, Edinburgh 8, Scotland, Further information and application forms will be available in January from the Meetings Officer, The Institute of Physics and the Physical Society, 47 Belgrave Sq., London SW 1, England.

### ICO

A congress on recent progress in optical physics will be held May 2 to 7, 1966, in Paris.

The technical program will include propagation of light, coherence, diffraction, polarization, nonlinear optics, optical information processing, etc. Spectroscopy as applied to the study of matter, as well as the purely quantized aspects of the phenomena,

## **TENNELEC TC 200**

A different linear pulse amplifier for nuclear spectrometry

This series is intended to explain the superiority of the TC 200 as a nuclear pulse amplifier ■ A complete technical description of this Fairstein-designed instrument is available on request ■

RESOLUTION VS. COUNT RATE - Preamplifier noise, detector processes, and main amplifier shaping networks control spectral peak width at low rates. Unipolar pulse shaping is indicated. The activeelement networks of the TC 200 are optimum 
At high rates, statistical fluctuations in the undershoot cause peak broadening, centroid shift, and a skirt on the low energy side. Bipolar shaping cures these defects. In conventional amplifiers with bipolar shaping, a combination of baseline fluctuation and differential nonlinearity in the stage preceding the second differentiator causes peak broadening at high rates, particularly when overloading signals are present. The TC 200 is free of this defect; all stages have the linearity and dynamic range of the output stage to improve resolution and increase the permissible overload level Also at high rates, the sum spectrum due to overlapping pulses becomes prominent. This spectrum is in the form of skirts on both sides of the main peak. For a given product of amplifier resolving time and count rate, skirt area but not shape is independent of pulse shape With regard to your experiments, the TC 200 gives better energy resolution than any other amplifier, particularly at high count rates ■ TENNELEC INSTRUMENT CO., INC. P. O. Box D. Oak Ridge, Tennessee

