

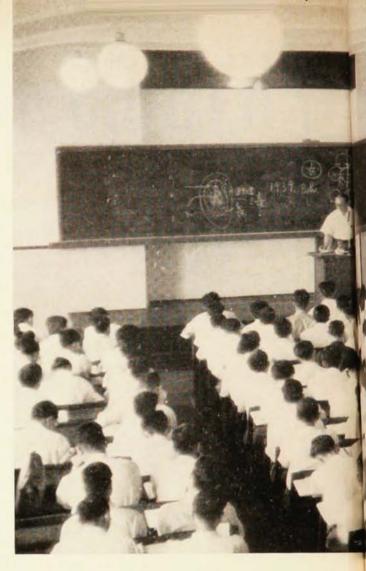
Fig. 1. Distributions (normalized to one another) in various fields of physics at the 1959 annual meetings of the Physical Society of Japan and the American Physical Society.

Annual
Physical
Society
Meeting

JAPAN STYLE

A conference report, contrasting the modus operandi of the PSJ Annual Meeting with that of the APS.

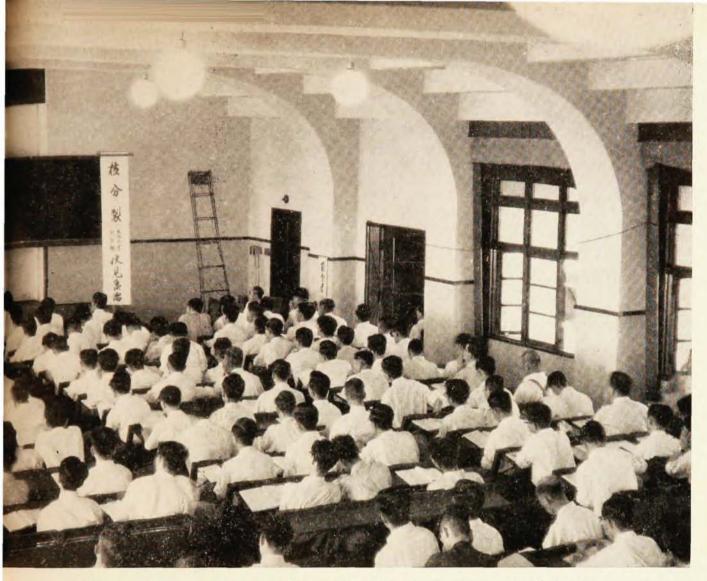
By Marshall F. Crouch



A SCIENTIFIC meeting is a gathering of specialists to participate in an interchange of ideas. The effectiveness of this interchange is influenced greatly by the manner in which the meeting is organized. Administrative matters such as the circulation of abstracts prior to the sessions and presentation of graphs and tables by the speakers are becoming problems of ever increasing magnitude. In the course of attending the Annual Meeting of the Physical Society of Japan held in Hiroshima October 8–12, 1959, the idea suggested itself that procedures were sufficiently different from those in the United States that a brief description might be of interest to readers of *Physics Today*, and might also hopefully suggest ideas for possible consideration.

The Hiroshima meetings featured seven hundred contributed papers, with around one thousand participants. The large number of contributed papers appears to reflect a tendency to include papers having the nature of progress reports. The distribution of these papers

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Lecture on fission given by Professor Koji Fushimi as part of program arranged by the Physical Society of Japan.

in the various fields is somewhat different from that of recent United States meetings, reflecting traditional concentration in certain fields, still-scarce accelerator facilities, etc. Strong interest in magnetism, semiconductors, and atomic and molecular physics is the notable trend. Fig. 1 shows the distribution in some detail. It should be borne in mind that sessions not specifically designated as theoretical frequently include a number of papers on theoretical subjects.

The local committee, showing true spirit of service, had arranged excellent facilities, including fifteen fine halls for sessions, several equipped with public address systems having some of the best transistorized wireless speaker's microphones yet seen. A large corps of university students had been recruited to assist the speakers and session chairmen, and these black-uniformed young men moved about the platforms in the finest tradition of the black-garbed scene changers who delight the Western visitor to the traditional Japanese theater performances. Indeed, just as the true Japanese theatergoer is completely unaware of the presence of these stage hands, it is quite possible that the Japanese physicists did not even see these students at all.

The majority of the speakers do not use lantern slides, but rather a system called "bira", which are large hand-lettered posters for graphs, equations, and tables. Wick-type poster lettering devices, only recently making extensive appearance in the United States, permit ready fabrication of figures in many bright colors. Perhaps experience in this sort of work is gained during the early undergraduate years when demonstrations are a favorite activity. The use of these "bira", which are mounted singly or stacked on special T-shaped wooden holders, permits the lectures to be staged in bright pleasant rooms which are a refreshing change from the usual dim, shrouded APS meeting halls with the interminable sequence of stacks of slides and the voices of a succession of unseen speakers droning on from the darkened rostrum. While the efficiency of the slide system cannot be denied, its soporific effect is equally undeniable, and doubtless has much to do with the popularity of informal corridor discussions at United States meetings.

The propriety of this latter custom has long been argued, and indeed it frequently seems that much painstaking effort that has gone into the preparation of the

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9単磁性体薄膜の研究は当初二次元結晶格子の自発磁気の可能性という興味から開発 されてきたことはよく知られている。ここではこの問題について主として実験の面からの 簡単なreview を試みたい。なお後に述べるように自発磁気に関して bulk の試料との差 か認められるのは約1000A以下であるので、以下薄膜或は単に膜と称する場合は殆どご れ以下のものを指している。

1) 理論的背景。

古くは Ising model,またWeiss 或は Stonerの半現象論的強磁性体理論によ れば、当然二次元格子も自発磁気を持ってよい筈である。一方 Bloch it Heisenberg model に立ち Spin wave 近似による三次元格子の自発磁気の計算をそのまま二次元格子 に適用して、その積分項の発散することから二次元格子の強磁性の可能性を否定した。よ く知られているようにKlein及びSmith はこのBlochの 数字は原3處数 理論を修正し、自発磁気の大きさMは膜厚(膜面に含まれる。

る原子層の数)に依存して変ることを導いた。沖1回に膜 厚(原子層の数)をパラメーターにして K-S理論の結果 き示す。M/Moが 0.75以下が点線で示してあるのは、Spin wave 近似の本質からMaMo以外の所では理論の正多さが 疑わしいがらである。Zener model によろ計算は未だ見 られたいようてあるが、Heisera)がこの modelで二次元格

Mois OoKa BRZ版化 子の強磁性の可能及び Curie温度の華頂における降下について言及していることを述べて

Tert bulk - Curie :

おく。 2) 実験。

薄膜の自発磁気に関する実験はすせに 1920 年代にも見られるが、本格的な研究は K-S 理論の後に行われてきた。実験方法も初期の弾動検流計による方法4)から磁気天秤5) 探り行() loop tracer", その他®)を使用する磁気的な方法、電気抵抗が、ホール効果の当を 利用する電気的な方法,Kerr"或はFaraday¹²⁾効果も利用する光学的カ方法と多岐に亘り、薄膜の製法も真空中蒸着、スパックリング、電気鍍金その他の試みられているが、以 下にその二三のものについて取上げてみる。

i) Crittenden-Hoffman 1:よる loop tracer を用いた NI 薄膜についての実験は K-S理論も半定量的に立証したものとしてよく知られている。 ML 彼等の実験結果は、K-S理論の curve に経験的構正をしたもの P (T=OとT=Toとも K-Sに揃え, 途中を Weiss形にする)によ* く一致し、從って Curie 温度もよく一致している。 沖2回に

495A

その結果を示してある。 -155 --

Fig. 2. A representative abstract from a solid-state physics session by K. Kuwahara of Hiroshima University. The generous sprinkling of English words is typical.

contributed papers is not properly appreciated. At times it even seems that the principal aim of such papers is little more than the establishment of a legal priority claim on one's findings. However, whatever the explanation may be, the observed fact is that most of the Japanese conferees seem to sit through entire sessions, with migration from session to session and corridor conferences during session hours being rather unusual. Perhaps this reflects in part closer acquaintanceship between researchers in a given field in Japan.

THE most notable innovation, and the one which prompted this report, is the abstract publication system. Each author of a contributed paper is furnished with a large sheet of paper ruled into light blue squares -the Japanese equivalent of our lined paper. He then hand-prints his abstract, one idiograph to a square on this sheet, which permits the equivalent of about a fourhundred-word abstract. However, if he wishes, he may use some of the space for graphs, tables, equations (written for maximum clarity rather than to suit a monotype operator), and even photographs. These authors' sheets are then reproduced in reduced size by a photo-offset process and bound together in book form. At the Hiroshima meetings, the 700-odd abstracts were bound in eight volumes, classified as to general content, so that the conferees could purchase whatever portions were of interest to them. Photographs, incidentally, are reproduced with approximately the degree of clarity of Physical Review halftones. Figs. 2 and 3 are representative abstracts chosen to illustrate the abundant information content of these hand-written abstracts. In Fig. 3, for example, if one uses the APS rule that the two display formulas must be reckoned as forty words each, and combines it with the well-known saying of Confucius, the total count is something like 3280 words! To cite another example, a recent research report by Dr. Leo Esaki, describing the first studies of 計算値と実測値

李 1 图

(五力單位 2014)

通 研 髙山一男 大原省爾 池上英雄

プラズマのマイクロ波に対する伝播特性(授素誘電率と)を測定することによって、プラズマの電子窓隻や電子温度を求めることができる。われわれは、プラズマ として放電管の陽光柱を用い、これに 4000 MC/S のマイクロ波を作用させた。 測定 は インピーダンス 測定法による、即ち 回路の特性 インピーダンスを Z。とすれば、プラズマ

のある場合のインピーダンス名と 誘電率と との 前には次の関係がある。

$$\frac{Z}{Z_{\bullet}} = \frac{1}{\sqrt{\varepsilon}}$$
(1)

更に 8 は、マイクロ波の 角周波数 ω , 電子の衝突周波数 ν (電子温度に関係する)、プラズマ振動の周波数 $\omega_p = 4\pi ne^2/m$ (n は 電子密度) を用いて次のように表わされる。(*)

$$\mathcal{E} = 1 - \frac{\omega_p^2}{\omega^2} - j \frac{\omega_p^2}{\omega^2} \frac{\nu}{\omega} \quad (\frac{\nu}{\omega} \ll 1) \cdots (2)$$

(1)式と(2)式から Zが れの画数 として表わされる。 中1 図はスミス図表にその)関係を表わしたものである。 実線(1) は V/ω = 0・実線(2) は V/ω = 0.1 の場合の理論値である。 アルゴンガス 1 mm Hg (V/ω ~ 0.1) の場合の実測値は X 乗 で示されてあるが、全体的な傾向は 理論値とよく一致している。また◎東は 4000 Mc/s に対して計算された 临界密度を示し、探針による実測値※美とほぶよく一致する。 和2 図は 圧力を変化させて 同様の測定を行った結果で、 V/ω の効果を示している。

以上の結果から、マイクロ波によるインピーダン 又測定により、プラズマの密度測定がかなり正確に 行われりる事が結論された。

*) H. Margenau : Phys. Rev. 69, 508 (1946).

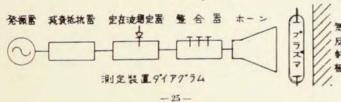


Fig. 3. A representative abstract from a session on plasma physics by Takayama, Ohara, and Ikegami of the Electrical Communications Laboratory.

the "tunnel diode" phenomenon, was printed as a letter to the editors of the *Physical Review* [Phys. Rev. 109, 603-604 (1958)]. Earlier it had appeared as an abstract of this sort for a Japanese scientific meeting where, by virtue of a series of four sketches of the energy levels at the junction under different conditions of applied potential, the exposition of the ideas was distinctly superior.

The five-day meeting included full schedules all day Saturday and Sunday, reflecting the diligence which is one important ingredient of the success of Japanese scientists. If one were to enumerate all of the small differences in what one observes at these meetings, having been familiar with the APS ones, the list could be arbitrarily long. However, a few features stand out. The distribution of ages of the participants seems to have somewhat less of a tail in the middle-aged and elder scientist region. Very few wives accompanied the physicists on the trip, but a somewhat more copious

sprinkling of women scientists is observed at the sessions than is usual in the United States,

The penurious young physicist can attend such a meeting on a very modest budget, traveling by third-class local trains and subsisting on travelers' box lunches sold at the meetings, or in small neighborhood shops serving meals tailored to the students' budgets. Alternatively one could elect to partake of the finest of tempura dinners at the inn of one's choice, featuring Hiroshima's excellent sea food. Provident planners even included a Japanese coffee shop and tea rooms to be set up at the meeting area.

Yet perhaps the most distinguishing small feature of the meetings is the Oriental bow which each speaker executes at the start and finish of his paper. It is a nice custom, indicating the respect and appreciation of the speaker for his auditors, as well as serving as clear punctuation marks to denote the beginning and termination of his remarks.