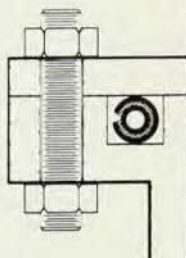


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letters

tutions with data not favorable on most of these factors would be more able to work toward improvement of their situations, if given nationwide data for comparison. Ultimately the results could be tabulated in parallel with the existing AIP directory of all institutions that teach physics. Persons using it could make more careful assessment of open positions, and achieve greater compatibility with the institution at which they choose to work.

JOHN H. MAULDIN
Winona State University
Minnesota

4/4/80

Chicago and ERA

As the head of a physics department with significant women enrollment—30% overall and nearly 40% of the freshman and sophomore classes—I took particular note of the full-column ad of the Optical Society of America in the Calendar Section in July, which urges our participation with them at the Annual APS Meeting in Chicago, 13–17 October 1980.

It seems appropriate to reiterate a stance that I took in these pages a few years ago.

No! I will not join with some colleagues at the Chicago meeting. In fact, I choose not to attend any function in Chicago or in Illinois or in any other State that refuses to ratify the ERA.

I am disappointed, but not surprised, that the APS continues to schedule Society events in non-ratifying states.

In lieu of any large-scale action, I hope that colleagues who share these feelings will strike a small blow for human rights by joining with me and others in passing up the Chicago meeting and other activities in Illinois, Louisiana, Florida, Nevada and so on.

GERALD A. FISHER

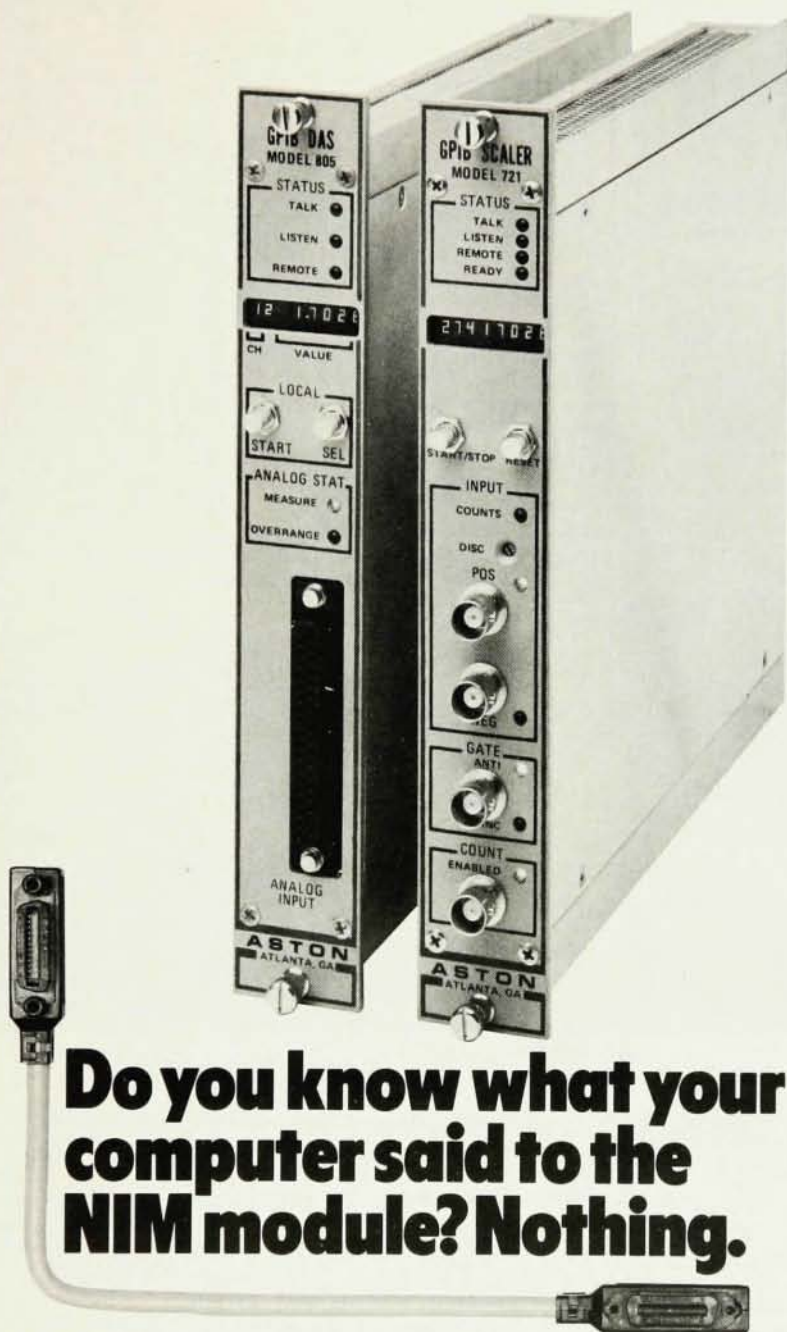
San Francisco State University

8/4/80

San Francisco, California

More on microfabrication

In two recent letters concerning the use of ion beams for lithography, the question of the relative sensitivity of polymer resists to ions versus electrons was raised (April, page 13). Our results¹ do not support the conclusions reached by R. Spohr and B. E. Fisher. We agree with them that as the deposited energy per particle increases, that is, as dE/dX increases, the exposure dose decreases as expected. Thus fewer ions are required to expose a resist than electrons, since each ion deposits more energy than an electron. However, we have found that the dose decreases nonlinearly as dE/dX increases. Thus the more fundamental measure of resist sensitivity—namely deposited energy



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per unit volume (E) required to expose a resist—is not a constant (as Spohr and Fischer assert it to be). In fact, E can increase by more than a factor of 10 for some resists, such as polybutene sulfone (PBS), while for others, such as novolac or polystyrene, E can decrease by a factor of 10 as dE/dX increases. Poly methyl methacrylate (PMMA) is unusual in that E is roughly constant.

The explanation for these results involves the basic chemistry of the particular resist in conjunction with the radial distribution of energy around the ion (or electron) path. These results are not without precedent if the larger question of the response of materials to ionizing radiation is examined. The formation of nuclear tracks in solids,² radiation dosimetry, and the relative biological effectiveness of ionizing radiation³ are related subjects.

References

1. T. M. Hall, A. Wagner, L. F. Thompson, J. Vac. Sci. Technol. **16**, 1889 (1979).
2. R. C. Fleischer, P. B. Price, R. M. Walker, *Nuclear Tracks in Solids, Principles and Applications*, U. of California Press (1975).
3. R. Katz *et al*, *Radiation Research* **47**, 402 (1971).

A. WAGNER

Bell Laboratories

5/2/80

Murray Hill, New Jersey

THE AUTHORS COMMENT: We completely agree with A. Wagner. The energy-dose concept is an undue oversimplification, however useful it may be as a first-order approach in a number of systems.

B. E. FISCHER

R. SPOHR

GSI, Darmstadt, West Germany

Help Sakharov do physics

I am writing to call attention to a particular difficulty in the situation Andrei Sakharov is facing now. As you know, he was sent by the Soviet authorities to internal exile to the city of Gorky in January 1980 and is prohibited from leaving the limits of this city, which is closed to foreigners. It is needless to repeat what kind of arbitrary persecution (without any grounds in the Soviet law) he is suffering from. However, I want to stress one of the aspects of this persecution, the most shocking for a scientist.

When Sakharov was banished to Gorky he was officially told that all his correspondence from abroad would be prohibited. This plainly means that he will be prevented from receiving the letters from his family members, children or grandchildren living in this country, but, moreover, he will not get

any single reprint, preprint, scientific letter or issue of scientific magazine mailed by his colleagues abroad. Up to the present moment this is indeed the case. Sakharov does not receive any scientific materials.

Despite all his trials for the last years, Sakharov is actively working in theoretical physics (see, for example, his most recent publications below). In the present circumstances he cannot either use the library or have access to recent journals or preprints. The Physical Institute of the Academy of Sciences, the Theoretical Department of which Sakharov still is formally acknowledged to be a member, has a very good library that he had been using before his exile to Gorky. Moreover, Sakharov no longer has access to his books at home in Moscow. There is no library in the city of Gorky that Sakharov has access to and which contains literature in the fields of his interest. I ask all specialists in the fields of current interest of Sakharov (high-energy physics, elementary-particle theory, and cosmology; see references 1-4 for details) and all physicists to send their reprints, and especially new preprints to Sakharov at his address:

Gorky, Sherbinka-2

Gagarin St. 214, ap. 3

Dr. A. D. Sakharov

CCCCP

2. Горький, Щербинка-2,
Улица Гагарина 214, КВ. 3
Др. А. Д. Сахаров

I use this opportunity to remind you of the call by Sakharov's wife, Mrs. E. Bonner, to speak out against unjust persecution of Sakharov and other scientists in the USSR.

References

1. A. D. Sakharov, "The baryonic asymmetry of the Universe," *JETP* **76**, 594 (1979). (English translation).
2. A. D. Sakharov, "Cosmological models of the Universe with rotation time's arrow," *Zh.E.T.F.* (to appear); *SLAC Trans.* #0192.
3. A. D. Sakharov, "Mass formula for mesons and baryons," *Zh.E.T.F.* (to appear); *SLAC Trans.* #0191.
4. A. D. Sakharov, "Estimate of the quark-gluon field coupling constant," *Zh.E.T.F.* (to appear); *SLAC Trans.* #0190.

DAVID CHUDNOVSKY

Columbia University

New York, N. Y.

6/16/80

Warning about jobs in Brazil

I would like to warn colleagues in physics about "too good to be true" contracts for research positions (advertised in *PHYSICS TODAY* last Winter) at the Instituto de Pesquisas Espaciais of the Conselho de Desenvolvimento Cien-