

LETTERS

Views ITERated on Proposed New Reactor, Ignitor, Fusion Power

In their debate about the International Thermonuclear Experimental Reactor (ITER) in the June issue of PHYSICS TODAY (page 21), Andrew Sessler, Thomas Stix and Marshall Rosenbluth failed to even mention several serious problems that are associated with the quest for fusion power. For example, as has been known for many years, any fusion reactor using deuterium would necessarily be large, expensive and unreliable because of the major difficulties that would be involved in handling the high-energy neutrons produced.¹

Furthermore, the presence of those neutrons would make the walls of the vacuum chamber radioactive and would weaken their structure. Preliminary plans for a prototype commercial reactor that might follow on from the proposed ITER project call for replacing the chamber's walls every two years or so. Each such replacement would result in the accumulation of hundreds of tons of nuclear waste.

Another large environmental risk lurks in the background of future work on fusion power. The tritium fuel would be created in a blanket of lithium that would soak up some of the reactor's neutrons. Like sodium, lithium is a very reactive metal; it burns or explodes upon contact with moisture. Lithium spiked with high levels of tritium could be dangerous. If a reactor accident were to expose the lithium blanket to air or water, explains a report on fusion by the European Parliament's Scientific and Technological Options Assessment Project, the blanket would "burn with an intense heat, initiating further accident events and itself releasing the tritium contained in the blanket."² The re-

port goes on to somewhat exaggerate the effects of a large-scale tritium release (compared to other radioactive materials, tritium emits relatively weak radiation that does not tend to linger or concentrate in living organisms). Nevertheless, the report does reflect prevailing public apprehension about the development of fusion power.

Is fusion power likely to become a reality any time soon? In 1990, Klaus Pinkau, the scientific director of the Max Planck Institute for Plasma Physics, admitted that "even after successful completion of the ITER project in about 20 years time, a further demonstration project (DEMO) will be necessary, so that at the earliest in 2050 a reactor capable of commercial electricity generation could go on stream."³

Perhaps the advocates of fusion power should reconsider their sense of urgency about continuing work on the ITER.

References

1. See, for example, M. A. Fischetti, IEEE Spectrum, August 1984, p. 33.
2. Quoted in the Economist, 16 September 1995, p. 10.
3. Quoted in Norbert Lossau, VDI Nachrichten Magazin, April 1990, p. 11.

IGOR FODOR
Munich, Germany

All of us who have worked on Ignitor were very glad to see that both sides in the ITER debate agreed on the importance and desirability of pursuing the Ignitor program, in which an effective international collaboration has played a key role. Several ideas concerning both the engineering and the physics of the ITER concept were pioneered by the Ignitor program.

However, Marshall Rosenbluth's concluding phrase, stating that the ITER is the "experiment designed as the first exploration of the burning plasma environment," may be a source of misunderstanding. In fact, Ignitor was proposed and designed—well before the ITER studies were undertaken—as the first scientific

Letters submitted for publication should be addressed to Letters, PHYSICS TODAY, American Center for Physics, One Physics Ellipse, College Park, MD 20740-3843. Please include affiliation, mailing address and daytime telephone number. We reserve the right to edit letters.

**SUPERCONDUCTING
MAGNET SYSTEMS**



***The Industry
Standard For
Quality And
Reliability!***

- ☒ Reliable "Workhorse"
Magnet Systems For
Demanding Applications
- ☒ MIL-STD Approved
Quality Control
- ☒ A Magnet Pioneer With
27 Years Fabrication
Experience
- ☒ World's Largest Supplier
of Helium Level
Instrumentation
- ☒ World's Largest Supplier
of Vapor Cooled Current
Leads
- ☒ On Time Delivery
- ☒ Technical Support
- ☒ Value Pricing

ATTENTION SURFERS!
Visit Our Internet Home Page
At <http://www.usit.net/ami>

American Magnetics, Inc.
PO Box 2509, Oak Ridge, TN 37831

Phone: 423-482-1056
Fax: 423-482-5472

Circle number 9 on Reader Service Card

exploration of the burning plasma environment, at a time when a good fraction of the interested physics community had been led to believe that ignition was a goal that could not yet be pursued. Rosenbluth was certainly not part of that opinion, and he has been a constant supporter of the Ignitor program.

BRUNO COPPI

*Massachusetts Institute of Technology
Cambridge, Massachusetts*

Although Stix/Sessler and Rosenbluth are clearly on different sides of the fence when it comes to whether or not to construct the ITER, they are just as clearly on the same side with respect to whether or not we should continue to pursue the objective of realizing controlled fusion's potential as a source of energy. As Stix and Sessler declare, "We three authors all pursue a common goal, an optimal strategy for magnetic-fusion research."

This statement and the rest of the ITER article imply that the quest for fusion power is an agreed-upon and broadly supported national goal, both in the US and in other developed countries. In reality, however, there is no such consensus, and fusion power clearly has both its supporters and its detractors.

Therefore, it would be a great service to the physics community if a comparable debate on the merits of fusion power—with emphasis on the technical and policy aspects of the issue and the implications thereof for both basic and applied research in this country—were to be published.

JANIS LAWYER

Washington, DC

Article on Ethnic Diversity Prompts Minority Retort

In his article "Making a Difference: Ethnic Diversity in Physics" (July, page 39), James Stith paints an honest but somewhat gloomy statistical picture of our production of minority physicists, and makes some good points about what we need to do to improve the situation.

There are two related points on which I would like to comment briefly. One is the importance of minority students having both majority and minority role models, as exemplified by the experience of just about all the individuals profiled in the article's sidebar.

My other point is that there is a diversity of role models, with some also

serving as mentors and others exerting their effect at a distance. Consider the far-reaching influence of, say, Nobel prizewinners or, albeit not in the field of physics, Michael Jordan and the late Barbara Jordan. And also consider the potential impact of the half-dozen physicists described in Jean Kumagai's lively sidebar—role models all, I'd say, and possibly future mentors as well.

AKILU SAUVAGE

Washington, DC

James Stith's article prompts me to make the following observations about ethnic representation and ethnic diversity.

Surely there is no logical reason why ethnic representation in physics needs to be homogeneous and mathematically proportional across ethnic groups; after all, there is no other academic or professional area in which ethnic representation is mathematically proportional. Although Stith describes disproportionate ethnic representation as a major problem, it is not at all clear why that should be so. Similarly, he states that disproportionate representation constitutes "isolation" and creates "stereotypes," but such an assertion implies that the only way to avoid stereotypes is to enforce totalitarian homogenization. Stith's account leaves me wondering why disproportionate ethnic representation is regarded as the absence of diversity. Need all groups be homogeneous and proportionately represented to establish "diversity"? When Stith says "diverse," he actually means "homogeneous."

Stith appears to be concerned only with ethnic diversity among physicists (in fact, he is concerned only with racial diversity). Perhaps it would be useful to know about diversity among physicists on the basis of, say, age, sexual orientation, weight, political views, religious beliefs, citizenship, geographic distribution or dietary preferences. And even within the category of ethnic diversity, Stith covers the subject in a very nondiverse manner; he inquires into representation only for three arbitrarily selected ethnic groups—blacks, Hispanics, and American Indians. Why the arbitrary selectivity? Does not this arbitrariness itself constitute bias?

STEVEN E. PLAUT

University of California, Berkeley

James Stith's study is based on a classification system that includes whites, blacks, Hispanics and Asians, and the author refers to these groups as "races." I must point out that



NEW - PORTABLE - POWERFUL

The MCA8000 is a full featured, low power multichannel analyzer intended to be used with a wide variety of detector systems.

FITS IN A SHIRT POCKET!



Size: 6.5" x 2.8" x 0.8"

(165mm x 71mm x 20mm)

Weight: <300 grams (including batteries)

Power: <300mW, battery or DC power

FEATURES

- Up to 8k data channels.
- Successive-approximation ADC with two stage input analog pipeline and sliding-scale linearization.
- Differential nonlinearity $\leq \pm 0.6\%$.
- Integral nonlinearity $\leq \pm 0.02\%$.
- Input accepts fast pulses - as short as 100 ns shaping time constants.
- Two TTL compatible gates for coincidence and anticoincidence.
- Stand-alone data acquisition.
- 24 hours of continuous data acquisition from two 1.5V AA batteries.
- PMCA Software supports ROI, energy calibration, peak information, MCA configuration, and file management.
- High speed 115.2 kbps interface.

AMPTEK INC.

6 De Angelo Drive, Bedford, MA 01730-2204 U.S.A.

Tel: +1 (617) 275-2242 Fax: +1 (617) 275-3470

email: sales@amptek.com http://www.amptek.com

Circle number 11 on Reader Service Card