Book Review

Measurement and Detection of Radiation. By Nicholas Tsoulfanidis, Hemisphere Publishing Corporation, New York (1983). 571 pp. $32.00.

This latest book on radiation detection and measurements is based on material presented by the author over a 10-yr period of college teaching. The author states that the text includes material everyone should be taught as well as the necessary background information persons involved in radiation measurements should know. The book is intended for upper-level undergraduates and first-year graduate students with only a minimum background in atomic and nuclear physics. The text is very well done and continues the quality so many have come to expect from the McGraw-Hill series in nuclear engineering.

The text is comprised of 17 chapters covering a large number of subjects and types of radiation detectors. There is a very useful chapter on statistics and errors, which includes many numerical examples to illustrate a particular concept or technique. Two chapters are devoted to atomic and nuclear physics and the interactions of radiation with matter. In addition, chapters are included on relative and absolute measurements, data analysis methods, electronics, and an introduction to spectroscopy. The text was clearly written for the experimentalist, with four more chapters devoted specifically to gamma- and x-ray spectroscopy, charged-particle spectroscopy, neutron detection and spectroscopy, and activation analysis. Although all of these subjects are of interest to those actively involved in the field and are certainly important, the text seems to have missed the point by failing to explain sufficiently just how certain radiation detectors actually work. Three relatively short chapters are devoted to gas-filled detectors, scintillation detectors, and semiconductor detectors. These chapters present only a minimal amount of information on each detector type and do not, in my opinion, allow students using the text to be able to select the proper detector for a particular application. This was one of the three stated objectives of the text.

The last two chapters of the text are devoted to health physics fundamentals and to special detectors and spectrometers. The chapter on health physics would have been better left to persons more conversant with the field. The author is obviously not a professional health physicist, and this chapter does much to perpetuate the slang and misunderstanding that many have attempted to eliminate from our written material. The chapter on special detectors and spectrometers is very superficial. Detectors, such as thermoluminescent dosimeters, track-etch detectors, photographic emulsions, and many others, are given only a brief mention. Although these detectors can be classified as special detectors, many are used widely, especially in the nuclear power industry, and deserve more discussion.

In summary, this reviewer found the text very interesting and potentially useful, because it brings together material that is normally found scattered throughout several courses and texts. For this reason, the text should be a very valuable reference or refresher text. However, the limited discussion on fundamental radiation detection principles makes the usefulness of the text, for anything other than an introductory course, questionable.

John W. Poston

Georgia Institute of Technology
School of Nuclear Engineering Health Physics
Atlanta, Georgia 30332

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About the Reviewer: John Poston is an associate professor in the School of Nuclear Engineering and Health Physics of the Georgia Institute of Technology (GIT) where he has been a staff member since 1977, following a long tenure in the Health Physics Division at the Oak Ridge National Laboratory. Dr. Poston's graduate studies, principally in health physics, were at GIT. He is coauthor, with G. G. Eichholz of a text and laboratory manual on radiaion detection.