

Research work on 3-D position-sensitive CZT spectrometers at the University of Michigan, and application to the Compton imaging of gamma ray sources

Glenn F. Knoll

Professor Emeritus of Nuclear Engineering and Radiological Sciences

Center for Radiation Detection Materials and Systems Seminar

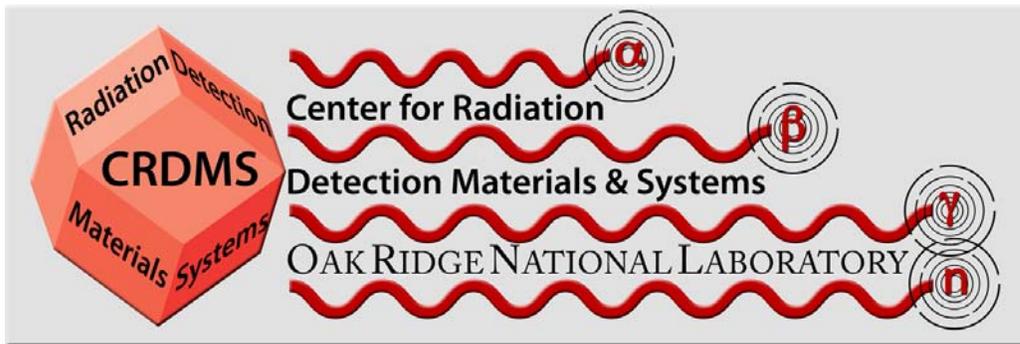
October 10, 2007

12:00 p.m., Building 4500N, Weinberg Auditorium

POC: John Neal, (nealjs1@ornl.gov), 865.576.8275

Our research program in the development of novel gamma ray spectrometers began about two decades ago and recently has concentrated on the development of cadmium zinc telluride (CZT) crystals that can operate at room temperature. Now led by Prof. Zhong He, these efforts have recently shown the significant advantages of 3-D pixilated readout for improving spectral performance and for implementing Compton imaging of gamma ray sources. When fitted with a pitch-matched multichannel ASIC for readout, the result is a compact module that can be tiled or assembled into arrays in which most of the mass is that of the detector crystals. Some of the results obtained to date will be shown together with projections of future systems that show great promise for detection and identification of weak gamma ray sources in a background of natural radioactivity.

Center for Radiation Detection Materials and Systems
Oak Ridge National Laboratory
Lynn Boatner, Director



GLENN FREDERICK KNOLL is Professor Emeritus of Nuclear Engineering and Radiological Sciences at The University of Michigan, and remains active on a part-time research appointment in the same department. Following his undergraduate education at Case Institute of Technology, he earned a Master's degree from Stanford University and a doctorate in Nuclear Engineering from the University of Michigan. He joined the Michigan faculty in 1962, and served as Chairman of the Department of Nuclear Engineering from 1979 to 1990, and as Interim Dean of the College of Engineering in 1995-96. His research interests have centered on radiation measurements, nuclear instrumentation, and radiation imaging. He is author or co-author of over 200 technical publications, 7 patents, and 2 textbooks.

He has been elected a Fellow of the American Nuclear Society (ANS), the Institute of Electrical and Electronics Engineers (IEEE), and the American Institute for Medical and Biological Engineering. He has been chosen to receive three national awards given annually by professional societies: the 1979 Glenn Murphy Award of the American Society for Engineering Education, the 1991 Arthur Holly Compton Award of ANS, and the 1996 Annual Merit Award of the Nuclear and Plasma Sciences Society (NPSS) of IEEE. He was a receiving editor from 1995 through 2006 for *Nuclear Instruments and Methods in Physics Research, Part A*, and is a current member of its Editorial Advisory Board. He is also a past member of the editorial boards for *Nuclear Science and Engineering*, *IEEE Transactions on Medical Imaging*, and *Physica Medica*. His textbook "Radiation Detection and Measurement" (Wiley, 3rd Edition, 2000) is widely regarded as the standard in its field. In 1999 he was inducted to membership in the National Academy of Engineering. In 2000 he received the highest faculty award from the College of Engineering of the University of Michigan, the Stephen E. Attwood Award. He has served as consultant to 30 industrial and governmental organizations in technical areas related to radiation measurements, and is a Registered Professional Engineer in the State of Michigan.

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