Professor Ken Amos

School of Physics, University of Melbourne, Australia

Ken Amos was born in Adelaide, Australia in 1940. He completed his Ph.D. at the University of Adelaide in 1965 and was subsequently employed as a postdoctoral fellow by the University of California (1964-65) and the University of Pittsburgh (1965-67). Between 1967 and 1970 he was an Assistant Professor at the University of Georgia, USA. In 1971 he returned to Australia to take up the position of Senior Lecturer at the University of Melbourne. In 1981 he obtained a D.Sc. from the University of Melbourne and was then promoted to the position of Reader. Since retiring in 2005 he has been a Principal Fellow at the University of Melbourne. During his career he has published 221 international peer-reviewed journal articles and given 151 conference presentations. His research interests include development and applications of direct reaction theory of elastic and inelastic nucleon scattering from nuclei, quantum inverse scattering theories of nucleon-nucleus scattering, algebraic models for total reaction cross sections, multi-channel algebraic scattering theory and applications. He is married and has three sons.

Plenary Lecture:

A Century of Nuclear Theory: a greatly condensed treatment

Over centuries, defining the underlying structure of matter has been a holy grail for scientists and the public alike. The discovery of the 'ultimate' nature of matter has often been seen as offering the ability to explain almost everything else in the universe, from life to the cosmos. During the twentieth century, nuclear physics became a science which promised to reveal many of these secrets. Through theory and experiment, nuclear scientists charted the underlying structure of matter and gave new insights into the fundamental nature of things. Over the last century, progress in nuclear physics has relied on a symbiotic relationship between theory and experiment. I will begin this talk with some (highly condensed) history of the first half century of developments in nuclear theory. I will then discuss the original shell model and the three stage view which Weisskopf proposed for nuclear reactions, as both are watersheds of the 50's. The period between the 1950's and 1990's was one of incredible developments in nuclear physics. There were many practitioners, the computer revolution made possible more and more complex evaluations, the numbers of models for structure and reactions became legion. Thus I will give only abridged catalogues of structure models and reaction types before a specific note on Butler's identification of direct reaction theory of deuteron stripping; a major process in defining spin-parities of nuclear states. Next, as it is one of the central aspects of scattering theories, I consider the optical model for nucleons, just what it should be, and its use in direct reaction theory of inelastic scattering. I restrict consideration to just two methods, the MCAS and the *g*-folding methods, with which I am most familiar. They were used to obtain results involving the scattering radio-active ions, that appear subsequently. Finally I look at the nuclear landscape as it is today, with the *exotic* nuclear systems, some of which are termed Borromean. I show how some are needed in the CNO stellar burning cycle and then give examples of spectra evaluation and scattering analyses made using the specific two methods considered.