

FOUNDER OF THE OPACITY PROJECT & THE IRON PROJECT: PROFESSOR MICHAEL J. SEATON

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Professor Michael J. Seaton was born on January 16, 1923 in Bristol, England. He went to High School at Wallington County. He worked for 2 years in a chemical factory before enlisting in the Royal Air Force as a navigator during the Second World War. He flew many dangerous missions bombing over the Continent, including over Germany. While at the Air Force, he studied on his own and advanced himself to one year of college. After the war he was admitted to University College London (UCL) as an undergraduate. Thereafter, he spent all his professional career at UCL.

Mike received his Bachelor's in 1948, and his Ph.D. with Sir David Bates in 1951. Most of his tenure at UCL was during the golden period of atomic and molecular physics and astrophysics research at UCL, led by Sir Harrie Massey as the head of the department of Physics and Astronomy. Among those who hailed from the UCL school, and later associated with the Queen's University of Belfast, are Alex Dalgarno and Phil Burke.

Seaton was elected a Fellow of the Royal Society in 1967. He is the recipient of an Honorary Doctorate from the Observatoire de Paris, an Honorary D.Sc. from the Queen's University of Belfast, and several prestigious awards. Seaton is a rare scientist, distinguished as an Honorary member of the American Astronomical Society and Honorary Fellow of the American Physical Society. He is also a Foreign Associate, also known as an honorary foreign member, of the US National Academy of Sciences.

Mike Seaton has made monumental contributions to atomic physics and astrophysics. He is the author of nearly 300 journal publications and many other articles. His pioneering research papers range from the first non-hydrogenic treatment of photoionization, quantum defect theory, electron-ion recombination, and many other areas in atomic physics. Among his recent works is the mathematical properties of attractive and repulsive Coulomb Functions that he wrote for Computer Physics Communications.

Seaton's works in astrophysics range from seminal papers on the central stars of planetary nebulae, density diagnostics using forbidden lines (developed jointly with Don Osterbrock), the Seaton extinction curve, plasma diffusion theory and several other topics. For example, the Herman-Seaton sequence of stars on Hertzsprung-Russel diagram refers to hot sub-dwarfs and nuclei of planetary nebulae.

Since 1983 Seaton has led the Opacity Project, an international team of about 30 atomic physicists and astrophysicists, to carry out large-scale atomic calculations for stellar opacities using the powerful R-matrix method developed by Phil Burke and adapted to the Opacity Project primarily by Seaton. The ab initio calculations for the atomic radiative processes and the resulting stellar opacities solved several outstanding problems in astronomy. The Opacity Project has been hailed as the "crowning achievement of computational atomic physics".

At a meeting at the Ohio State University in 1992, Seaton named and laid the foundation of the present follow-up project as the Iron Project to study collisional and radiative processes for iron and iron peak elements. Over 60 papers have been published in Astronomy and Astrophysics in the IP series. Seaton's most recent work concerns radiative accelerations of elements in stars. The OP opacities were recently employed by John Bahcall and others to address the current controversy regarding abundances of elements in the Sun.

At the age of 83, Seaton continues to be active in research, and an immense source of inspiration to all who know him.

Michael J. Seaton has been hailed as the "Father of the Atomic Astrophysics".