

Prof. Ian H. Hutchinson

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B.A. (Natural Sciences: Physics), Cambridge University (1972)

Ph.D. (Engineering Physics), Australian National University (1976)

Ian H. Hutchinson (born 1951) is Professor of Nuclear Science and Engineering at the Massachusetts Institute of Technology. His primary research interest is plasma physics, especially the magnetic confinement of plasmas (ionized gases): seeking to enable fusion reactions, the energy source of the stars, to be used for practical energy production. He and his MIT team designed, built and operate the Alcator C-Mod tokamak, an international experimental facility whose magnetically confined plasmas, with temperatures reaching beyond 50 million degrees Celsius, are prototypical of a future fusion reactor.

Following undergraduate education at the University of Cambridge, his graduate studies, as a Commonwealth Scholar at the Australian National University, involved experiments on one of the earliest tokamaks to operate outside the Soviet Union. After groundbreaking research (1976-9) on MIT's earliest major tokamak experiment, he worked on a different confinement configuration, the Reversed Field Pinch, with the U.K. Atomic Energy Authority, where he made landmark measurements of magnetic turbulence structure showing that it could explain the energy transport. He returned to MIT in 1983 as a member of the Nuclear Engineering department faculty. He directed the Alcator project from 1987 to 2003, and served as Head of the MIT Department of Nuclear Science and Engineering from 2003 to 2009.

His personal scientific contributions span many areas of plasma physics, including the first direct measurement of anomalous resistivity during MHD disruptions and of hollow current profiles during current rise, the first observations of polarized tokamak electron cyclotron radiation and development of diagnostics of thermal and nonthermal electron distributions based on it, fundamental theory of Mach probes to measure plasma flow, comprehensive computational and analytic studies of the interaction of flowing plasmas with embedded objects, and observations of spontaneous tokamak plasma rotation.

In addition to over 180 journal articles on a variety of plasma phenomena, Dr. Hutchinson is widely known for his standard monograph on measuring plasmas: *Principles of Plasma Diagnostics*, whose second edition was published by Cambridge University Press in 2002. He has served on numerous national fusion review panels, on the editorial board of *Physics of Fluids B*, and the *New Journal of Physics*; and was editor in chief of the journal *Plasma Physics and Controlled Fusion* (2000-4). He was the 2008 Chairman of the Division of Plasma Physics of the American Physical Society. His present personal research interests include plasma momentum transport, MHD instability suppression and measurement, real-time plasma control, plasma radiation, interactions of flowing plasmas with solid objects and dust particles, and tokamak boundary phenomena. He is a fellow of the American Physical Society and of the Institute of Physics.

Hutchinson is also the author of the computer program TtH a TeX to HTML translator, widely used for web-publishing of mathematics. He has written and spoken widely on the relationship between science and the Christian faith. He is an enthusiastic fly-fisherman, squash player, and choral singer.