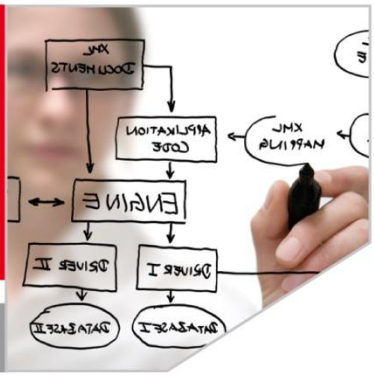
The Prospects for a Nuclear Fusion Powered Future



Joint Electrical Institutions Sydney - Engineers Australia, IEEE, IET

Public Lecture

Date:	Thursday, 27 June 2013
Time:	5:30 pm for 6:00 pm start
Venue:	Engineers Australia Auditorium, Ground Floor, 8 Thomas Street, Chatswood
Speaker:	**Professor John Howard** **Head, Plasma Research Laboratory, The Australian National University**
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RSVP:	https://engineersaustralia.wufoo.com/forms/joint-electrical-seminar-27-june-2013/

ABSTRACT:

The possibility of harnessing the processes that power the sun has motivated fusion research for the last 50 or more years. However, it seems that the prospect of a viable commercial nuclear fusion reactor remains 50 years away. Nature has presented many unanticipated obstacles and deep challenges that have slowed progress and blunted early optimism for controlled fusion power.

Nevertheless, a number of tantalizing "gifts" have provided encouragement along the way. Among them, the fusion process can be self-sustaining and can breed its own fuel. Natural "high-confinement" modes have been discovered that halve the requirements on required input power. Concurrent advances in superconducting magnet technology, advanced heating technologies and powerful computers have contributed to an increase in device performance, over a period of decades, which exceeds Moore's law for the growth of computer chip memory density. It is now expected that the new international ITER tokamak under construction in France, and coming online in 2020, will demonstrate a nett power output of 500MW, sustained for many minutes.

This talk will review the operating principles of magnetic confinement devices and fusion power and show how fusion could ultimately contribute to economically-viable baseload power generation. Australia's role in fusion power research will be discussed, including our endeavours to engage with and contribute to the international fusion program.

SPEAKER BIOGRAPHY

Professor John Howard is head of the Plasma Research Laboratory (PRL) at ANU with more than 30 staff and students working in the areas of plasma physics and nuclear fusion. The PRL houses the H-1 heliac National Plasma Fusion Research Facility.

After obtaining his PhD in 1983 in plasma physics at the University of Sydney, Prof Howard worked in the Dept of Electrical Engineering at UCLA until his return to the ANU in 1989. He is an expert in the diagnosis and physics of plasmas and also has interests in the broad area of remote sensing and inverse methods with links into industry. Professor Howard is a Fellow of the Institute of Physics and serves on various editorial boards and international committees. He has published approximately 100 papers in peer-reviewed journals and has won more than $2.5M in research grants in the past 5 years. He invented coherence imaging optical systems that are now installed on many of the world's largest fusion devices. Based on this work he was a finalist in the 2012 Australian Innovation Challenge.

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