

**Professor Jeffery L. Tallon**  
**IEEE Distinguished Lecturer**  
**Notes on travel and lectures in 2015**

**List of lectures delivered:**

**11 February** “Critical current density and the superfluid density in superconductors” International Conference AMN-7 (Advanced Materials and Nanotechnology) Nelson, New Zealand

**5 March** “High-Tc superconductors – from thermodynamics to applications” University of Wollongong, Australia

**6 March** “High-Tc superconductors – from thermodynamics to applications” University of Melbourne, Australia

**28 April** “Echoes of the Big Bang – superconductivity and cosmology”, public talk at the Tauranga Astronomical Society (record turnout for a public lecture).

**24-27 May** “Critical currents and the pseudogap phase diagram”, Gordon Research Conference in Superconductivity, Hong Kong, China.

**28 May**, Plenary Talk “The design of high-Tc superconductors: from thermodynamics to applied properties”, Japan Cryogenics and Superconductivity Meeting, Tsukuba, Japan.

**14-16 June**, Opening address “Thermodynamics and universal behavior in cuprate and pnictide superconductors”, American Ceramic Society – International Conference of Ceramic Materials for Energy Research, Vancouver, Canada.

**17 June**, “High-Tc superconductors – from fundamental physics to applications”, University of British Columbia, Canada.

**19-23 July**, Plenary address “Probing the unusual superconducting and normal states of cuprate superconductors using neutrons”, Oceania Conference on Neutron Scattering, Sydney, Australia.

**28 July**, Public lecture “Superconductivity and the energy challenge”, Royal Society, Napier, New Zealand.

**24-28 Aug** Invited talk “Mechanism and phenomenology of superconductivity in HTS cuprates”, M2S International Conference, Geneva, Switzerland.

**3 Sept** “High-Tc superconductors – from fundamental physics to applications”, Cambridge University, UK

**11 Sept** “High-Tc superconductors – from fundamental physics to applications”, Bristol University, UK.

**14 Sept** “High-Tc superconductors – from fundamental physics to applications”, Gothenburg University

**16 Sept** “High-Tc superconductors – from fundamental physics to applications”, Lund University, Sweden

**18 Sept** “High-Tc superconductors – from fundamental physics to applications”, Vienna University of Technology, Atominstitut, Vienna, Austria

**22 Sept** “High-Tc superconductors – from fundamental physics to applications”, High-Field Magnet Laboratory, Nijmegen, Netherlands

**23 Sept** “High-Tc superconductors – from fundamental physics to applications”, Technical University of Denmark, Copenhagen.

**24 Sept** “High-Tc superconductors – from fundamental physics to applications”, University of Leipzig, Leipzig, Germany.

**25 Sept** “High-Tc superconductors – from fundamental physics to applications”, Technical University Dresden and Institute of Solid State Research, IFW, Dresden, Germany.

**22-25 Oct** “Thermodynamics of cuprate superconductors – phase behaviour and the question of quantum criticality” Institute of Physics, Chinese Academy of Sciences, Beijing.

**27 Nov** “Superconductivity, a 21st century technology impacting on all sectors – energy, transport, health, communications and the universe!” IEEE Auckland Branch Annual Meeting, School of Engineering, Auckland University.

This is a total of 22 lectures so far.

In the first half of 2016 I propose to return to Canada and complete the IEEE Lectures in Israel – including Technion, Tel Aviv University, University of the Negev and Bar Ilan University.

### **General comments:**

(i) I presented a positive picture of the emerging opportunities for HTS applications drawing on our own experience with manufacturing and associated developmental work, as well as the challenges now arising out of some of the future major facilities such as ITER and upgrades/replacement of the LHC. At the same time I sought to show the relationship between fundamental understanding and the key applied properties for enhanced performance – a story that I am particularly well positioned to tell. I also provided some perspective on new discoveries in SC materials, especially including H<sub>2</sub>S at very high pressure, and the ongoing materials challenges. When appropriate I also described the relationship between SC and cosmology. The public lectures had record turnouts.

(ii) while these lectures were ostensibly for the benefit of the various audiences I have also been a major beneficiary from the opportunities the DL has offered. I have met many people and learned a great deal across the wider field of SC from my many laboratory tours. This has opened up a number of new collaborations.