



IDCOM Seminar Series

Monday 06 October 10.30am

Seminar D/E, Alrick Building, KB

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Recent developments in combustion monitoring by TDLAS and ECT

Abstract: To meet higher and higher standards on combustion efficiency and pollutant emissions in nowadays aviation, advanced flame monitoring techniques are highly desired to measure and monitor distributions of temperature, pressure and component concentrations in combustion flow fields and even validate combustor design, combustion model, etc. As a non-intrusive, fast, sensitive and cost-effective modality, the tunable diode laser absorption spectroscopy (TDLAS) technique has gained widespread applications in accurate measurements of temperature and species' concentration in the combustion flow field. In addition, the ECT (Electrical Capacitance Tomography) technology helps to obtain the distribution of dielectric permittivity in the interior of combustion flame from external capacitance measurement. Compared with a TDLAS sensor, the ECT sensor has a simpler structure without moving parts and its adaptability and reliability attracts more and more attention from scientists and even the engineers. By combining TDLAS tomography and ECT, the relationship between the dielectric permittivity distribution, temperature field and gas concentration distribution are expected to be established. The combined sensor established relationship model can be used to online monitor the exhausted plume at the aero-engine combustor exit. The research can not only provide effective references for the design of high performance aero-engine combustion system, but also help work out a reliable scheme to monitor the health status of aero-engines

Biography: Professor Lijun Xu (IEEE senior member'04) received his BSc, MEng and PhD degrees in electrical engineering and instrumentation from Tianjin University, Tianjin, China, in 1990, 1993 and 1996, respectively. From 1997 to 2001, he was an Associate Professor with the School of Electrical Engineering and Automation, Tianjin University, China. From January 2002 to December 2004, he was a Research Fellow with the University of Greenwich at Medway, Chatham, U.K., and the University of Kent, Canterbury, U.K. From December 2004 to April 2006, he was a Higher Scientific Officer with the Department of Physics, Institute of Cancer Research, University of London, London, U.K. From April 2006, he has been a Professor with and is currently the vice dean of the School of Instrument Science and Opto-Electronic Engineering, Beihang University, Beijing, China. He has authored or coauthored more than 200 publications. His current research interests include tomographic imaging, digital imaging and dynamic process monitoring. Dr. Xu was elected as one of the key teachers in higher education and one of the excellent researchers in the new century by the Ministry of Education, China, in 2000 and 2007, respectively. He won the National Science Fund for Distinguished Young Scholars of China in 2012. He was elected into the Ministry of Science and Technology Innovation Talents Promotion Project in 2013. He is the winner of China Instrument and Control Society (CIS)'s Science and Technology Award (first class, 2014), Ministry of Education's Technology Invention Award (first class, 2012), Tianjin Natural Science Award (second class, 2001) and the Sixth Tianjin Youth Science and Technology Award (2001), respectively.

Tea, coffee, biscuits – 10am Seminar D/E