

SEMINAR



SERIES

北京大学工学院

航空航天工程系

湍流与复杂系统国家重点实验室

题目：Combustion instabilities in multi-flame systems

报告人：Nicholas Worth

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报告内容摘要：

Gas turbine engines are an integral part of the global energy production infrastructure. The ability to rapidly scale their power output makes them an attractive partner to intermittent renewable energy sources, meaning they are likely to retain their importance throughout the energy transition. There has long been a focus to reduce the emission of pollutants such as nitrous oxides (NO_x) from gas turbines, but the impending climate crisis means there is a growing need to also eliminate the emission of carbon dioxide (CO_2). One promising method of achieving this is to switch from hydrocarbon-based fuels such as natural gas (mainly composed of methane – CH_4), to fuel blends composed of increasing proportions of carbon-free fuels such as hydrogen (H_2) and ammonia (NH_3). However, switching to these fuels is challenging due to substantially different fuel properties. Designing future gas turbine systems that can operate in a fuel-flexible manner, accepting a wide variety of alternative carbon-free fuels is not straightforward, and hindered by our incomplete understanding of these fuels and some important phenomena which occur during their use, including flame stabilization, combustion instabilities, and harmful emissions. In this talk recent experimental work on thermoacoustic instabilities in annular combustors will be presented, with an emphasis on the careful excitation of modes of interest, and the effects of realistic boundary conditions. Work will also be presented from a simple axially staged combustor, in which the concept of flexible fueling is briefly explored.

报告人简介：

Nicholas Worth is a Professor and Head of the Thermo-fluids research group at the Department of Energy and Process Engineering at the Norwegian University of Science and Technology (NTNU). He received his doctorate from the University of Cambridge in 2010, through an EPSRC doctoral training scholarship, and has held positions as a postdoctoral researcher and a senior research fellow at Cambridge University, and worked as a research engineer at Rolls Royce. He is the previous recipient of an ERC starting grant (2016-2021), the Gaydon prize (2013) and distinguished paper award (2023) from the Combustion Institute, and an ASME best paper award (2021). His main research areas are in turbulent combustion and thermoacoustics, the structure of turbulent flows, and the development of advanced experimental methods.



时间：2023年6月13日（周二）中午 12:00 – 14:00

地点：北京大学 工学院 1#楼 210 会议室

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