COMBUSTION WEBINAR

The qualitative structure of linear thermoacoustic modes in gas turbine combustors

Speaker: Jonas Moeck, the Norwegian University of Science and Technology (NTNU)

Time: Oct. 9th 2021

10 am EDT; 16:00 Paris; 22:00 Beijing.

Zoom Meeting ID: 959 5515 8623
Passcode: combustion
Check *https://sun.ae.gatech.edu/combustion-webinar*
for details or directly contact wenting.sun@aerospace.gatech.edu

COMBUSTION WEBINAR

Biography: Jonas Moeck is an Associate Professor in the Department of Energy and Process Engineering at the Norwegian University of Science and Technology (NTNU). He received engineering degrees from the University of Michigan and the Technical University Berlin, a PhD from the latter institution and was a postdoctoral scholar at Laboratoire EM2C, Ecole Centrale Paris. His research interests include combustion of carbon- free fuels, flame dynamics, low-order modeling and stability analysis, combustion control, and plasma-assisted combustion. He has received three best paper awards from the ASME related to thermoacoustic modeling.

Abstract: Unsteady combustion phenomena arising from the interaction of the flame's heat release with acoustic resonances of its enclosure are ubiquitous in energy conversion devices. In most cases, self-excited combustion oscillations observed in laboratory experiments or full- scale applications originate from a linear instability of the steady operating state. Although a challenging task for complex industrial systems, the onset and characteristics of this undesirable dynamic phenomenon can, in principle, be predicted based on concepts from traditional linear stability analysis, in other words, by solving an eigenvalue problem. Today's power generation gas turbines are predominantly equipped with annular or can-annular combustion chambers. These systems nominally exhibit a high degree of spatial symmetry, and this has strong consequences on the general spectral properties of the thermoacoustic dynamics. I will discuss key features associated with thermoacoustic modes in annular and can-annular configurations, and illustrate their relevance and how they manifest in systems with these combustor architectures.

Combustion Webinar Organization Committees

Advisory Committee

Yiguang Ju (Princeton University)
Fei Qi (Shanghai Jiao Tong University)
Philippe Dagaut (CNRS-INSIS)
Gautam Kalghatgi (Univ of Oxford/Saudi Aramco)
Med Colket (RTRC, Retired)
Chung K. (Ed) Law (Princeton University)
Katharina Kohse-Höinghaus (University of Bielefeld)
Kaoru Maruta (Tohoku University)
Kelly Senecal (Convergent Science)
Toshiro Fujimori (IHI Inc.)

Technical Committee

Wenting Sun (Georgia Tech) ***Co-Chair***
Lorenz R Boeck (FM global)
Liming Cai (Tongji University)
Zheng Chen (Peking University)
Matthew Cleary (The University of Sydney)
Stephen Dooley (Trinity College Dublin)
Tiegang Fang (North Carolina State University)
Aamir Farooq (KAUST)
Michael Gollner (UC Berkeley)
Wang Han (The University of Edinburgh)
Jean-Pierre Hickey (U. Waterloo)
Xinyan Huang (Hong Kong Polytech Univ.)
Tai Jin (Zhejiang University)
Tina Kasper (University Duisburg-Essen)
Isaac Boxx (DLR) ***Co-Chair***
Deanna Lacoste (KAUST)
Davide Laera (CERFACS)
Joseph Lefkowitz (Technion)
Qili Liu (Purdue University)
Yushuai Liu (IET, CAS)
Zhandong Wang (USTC)
Nicolas Noiray (ETH Zurich)
Guillermo Rein (Imperial College London)
Xingjian Wang (Florida Institute of Technology)
Jun Xia (Brunel University London)
Huahua Xiao (USTC)
Dong Yang (SUSTech)
Suo Yang (University of Minnesota)
Peng Zhao (University of Tennessee, Knoxville)

Disclaimer

- The presentation materials and comments made by the lecturer and participants are only for research and education purposes.
- All presentation materials are the sole properties of the lecturer and the Combustion Webinar organizer, and cannot be published and disseminated without written approvals from both parties.
- This lecture may be recorded and released to public.

- **Please use Chat or Raise Hand to ask your questions.**
- **Please turnoff microphone. Webinar will be locked after 30 minutes.**
- **Recorded lectures are on *Combustion Webinar YouTube Channel***

https://www.youtube.com/channel/UCSsO7e9VIn__RejSiAPF0JA