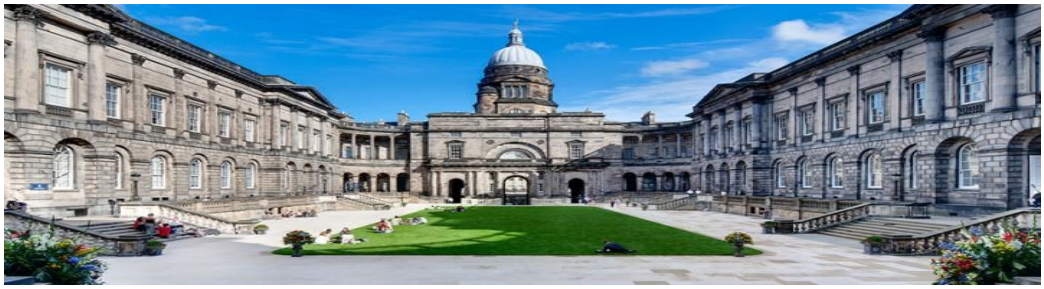


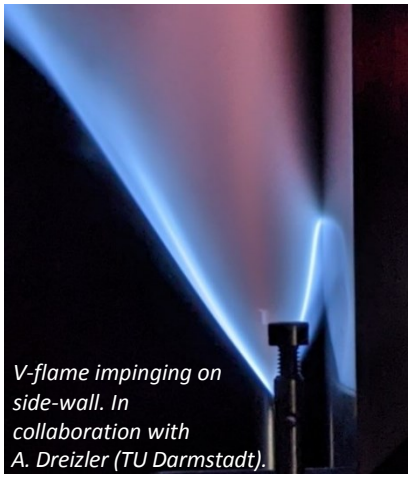
Post-doctoral position at University of Edinburgh

Advanced laser diagnostics for Reacting flows in Turbulent Boundary Layers

Description: The subject of flame-wall interactions (FWI) is becoming increasingly important as we transition to smaller, lightweight propulsion systems. The presence of walls alters the thermo-chemical and fluid dynamic processes of the flame, while the flame imposes high heat fluxes at the wall. The interaction of the flame & wall occurs through a turbulent boundary layer, which adds further dynamics to flame behavior and wall heat fluxes. Advanced experiments resolving the thermo-chemical and thermal-fluidic processes are needed to understand and predict these dynamics.

Position: Dr. Brian Peterson is accepting applications for a 2-3 year Postdoctoral Research Associate (PDRA) at the University of Edinburgh. This PDRA is affiliated with a recently awarded EPSRC project involving fundamental investigations of flame-wall interactions in turbulent boundary layers. This research will focus on advanced laser diagnostics to resolve the thermo-chemical and thermal-fluidic processes at gas/wall interfaces. In particular, we are investigating the processes governing energy transfer and flame behavior in turbulent boundary layers during FWI. We are hiring a PDRA who has experience with either:

- Short-pulse Coherent anti-Stokes Raman Spectroscopy (CARS)
- Laser-induced fluorescence (LIF)



V-flame impinging on side-wall. In collaboration with A. Dreizler (TU Darmstadt).

Our research utilizes a hybrid fs/ps rotational CARS approach in 1D to resolve gas temperature and species normal to surfaces. This will be coupled with LIF (OH or CH_2O) to resolve flame behaviour and thermochemical states simultaneously.

The PDRA will work alongside two PhD students and another PDRA, who are working with these diagnostics as well as Thermographic Phosphors and Particle Image Velocimetry. Candidate expertise in these diagnostics is also welcome. The appointee will use CARS and LIF to study e.g., (1) the (de)coupling of temperature and reaction rate variables near walls; (2) the transient thermal losses and corresponding flame behavior within the thermal boundary layer; (3) hydrodynamic and thermal boundary layer statistics describing energy transfer. The PDRA will engage with research partners at TU Darmstadt (Germany) and at Newcastle University (UK).

Requirements: Candidates should have experience with gas-phase temperature and/or species concentration measurements in reacting flows. Strong candidates will exhibit the ability to learn new diagnostics and apply them for fundamental investigations of FWI. Candidates must have (or will soon receive) his/her PhD in Engineering, Physics, Physical Chemistry or similar.

The optimal start date is October-November 2021. Later start dates are possible.

Apply: Interested candidates should apply at the following site by 11th August 2021: https://elxw.fa.em3.oraclecloud.com/hcmUI/CandidateExperience/en/sites/CX_1001/job/1578. For any questions please contact Dr. Brian Peterson (brian.peterson@ed.ac.uk).

THE UNIVERSITY of EDINBURGH
School of Engineering