

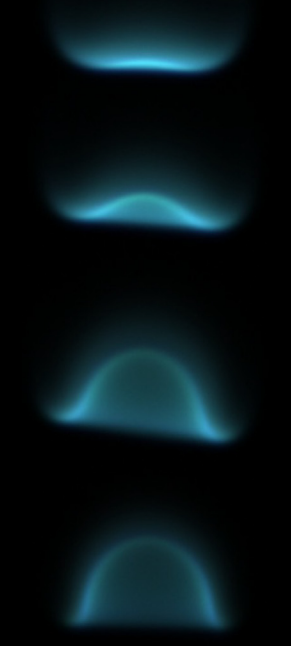


# ACME: Advanced Combustion via Microgravity Experiments

**WHAT?** Six independent investigations of laminar, non-premixed flames of gaseous fuels led by...  
**WHO?** Profs. R.L. Axelbaum, D. Dunn-Rankin, C.K. Law, M.B. Long, J.G. Quintiere, and P.B. Sunderland  
**WHEN?** September 2017 to February 2022 for spaceflight operations  
**WHERE?** Combustion Integrated Rack (CIR) in the U.S. Lab of the International Space Station (ISS)  
**WHY?** (1) Improved efficiency and reduced pollution in terrestrial combustion and (2) spacecraft fire prevention



Italian astronaut Paolo Nespoli installing the ACME chamber insert into the CIR.



Time-lapse composite photo of the lifting of a Coflow Laminar Diffusion Flame (CLD Flame).



NASA astronaut Joe Acaba and Russian cosmonaut Alexander Misurkin exchanging a CIR oxidizer bottle.



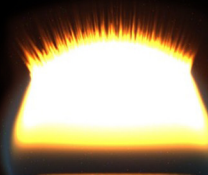
Flame 'pushed' toward the coflow burner in an Electric-Field Effects on Laminar Diffusion Flames (E-FIELD Flames) test.



NASA astronaut Joe Acaba aligning hardware within the ACME chamber insert.



NASA astronaut Kate Rubins with the ACME chamber insert removed from the CIR to configure it for the CLD Flame experiment.



Burning Rate Emulator (BRE) flame shortly after ignition.



Japanese astronaut Norishige Kanai working at the CIR to replace camera optics.



Canadian astronaut David Saint-Jacques replacing the hot-wire igniter tip within the ACME chamber insert.



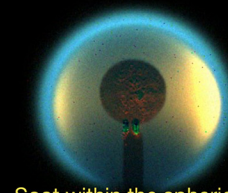
Soot within a hot flame from a Cool Flames Investigation with Gases (CFI-G) test.



Pyrometric measurements of flame temperature in a Structure and Response of Spherical Diffusion Flames (s-Flame) test.



NASA astronaut Victor Glover working to remove broken pyrometry fibers.



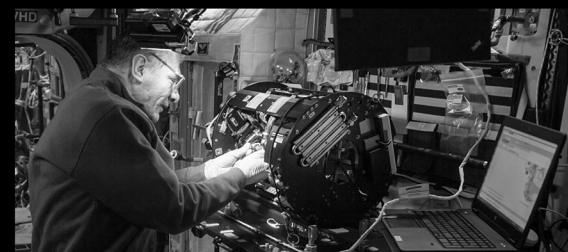
Soot within the spherical flame of a Flame Design test.



Flame in an E-FIELD Flames test with no air coflow.



NASA astronaut Christina Koch reconfiguring the ACME chamber insert for the Flame Design study.



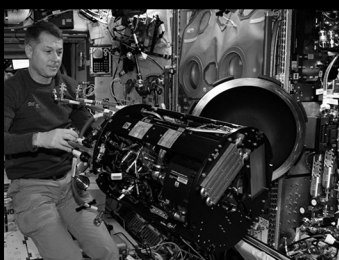
Italian astronaut Paolo Nespoli configuring the ACME chamber insert for CLD Flame testing.



Large soot agglomerates in a Flame Design test.



NASA astronaut Christina Koch replacing a burner within the ACME chamber insert.



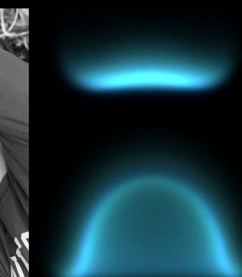
NASA astronaut Shane Kimbrough preparing the ACME chamber insert for inverse Flame Design testing.



BRE flame that has quenched at the top due to radiative heat loss.



NASA astronaut Nick Hague replacing a mass flow controller on the ACME chamber insert.



Time-lapse composite photo of the lifting of a CLD Flame from the coflow burner.



NASA astronaut Jessica Meir replacing one of the CIR's image storage units.



Quasi-steady flamelets in an s-Flame test.



Hot inverse CFI-G flame with glowing thermocouple tip.



Soot outside of a hot inverse CFI-G flame in which an oxygen/nitrogen mixture flows from the burner into an atmosphere of gaseous fuel and nitrogen.



Pyrometric temperature measurements in a BRE test.