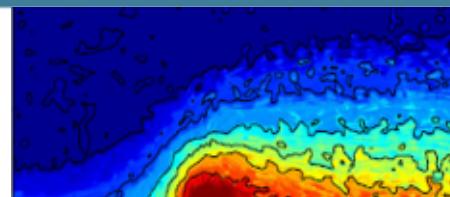
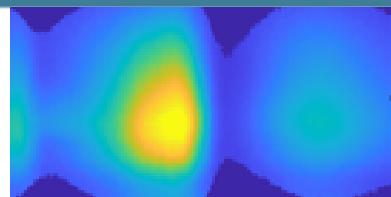




Sandia  
National  
Laboratories

# SNL Plasma Research Facility (PRF)



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7 October 2021

74<sup>th</sup> Gaseous Electronics Conference

Huntsville, Alabama



Sandia National Laboratories' Plasma Research Facility is funded by the U.S. Department of Energy's Office of Science, Fusion Energy Sciences.

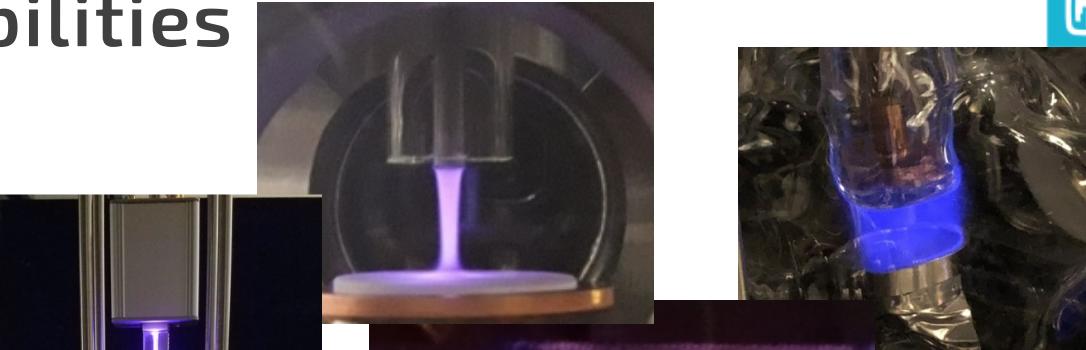
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## 2 Sandia PRF Differentiating Capabilities



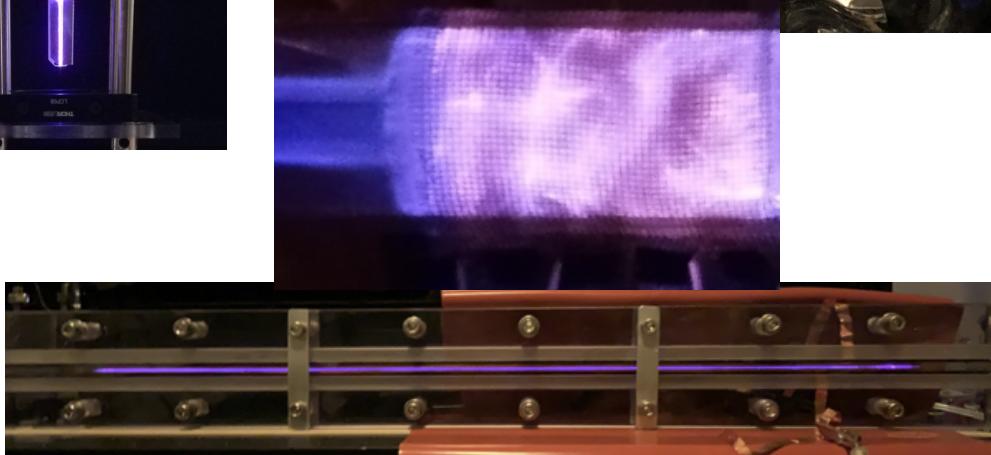
Multiple femtosecond, picosecond, nanosecond and CW lasers for interrogating dynamic plasma and reactive environments

- Neutral species density – LIF, PF-LIF
- Electric Fields (LIF-Dip, EFISH)
- Electron Densities - LCIF
- Multidimensional CARS for gas and surface phase interrogation



High speed imaging and detectors capabilities

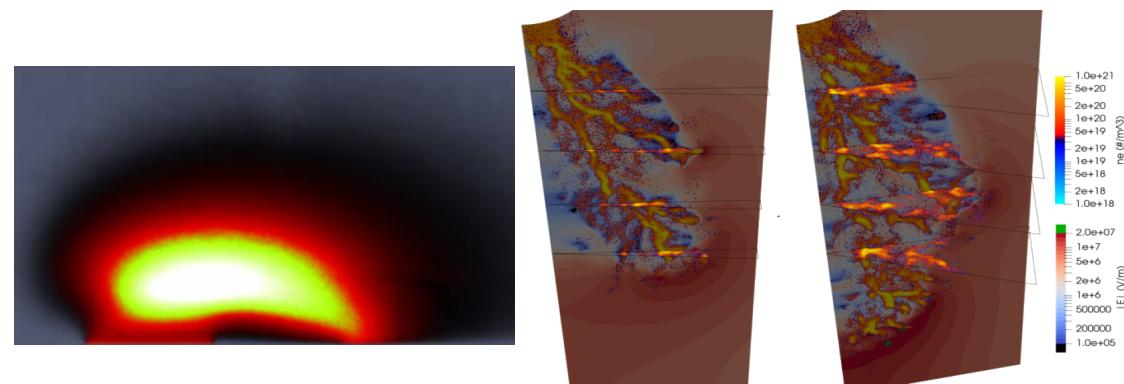
- <200 ps gated cameras, multi-frame framing cameras and high-speed CMOS cameras, streak camera
- VUV to Visible to IR spectrometers



High resolution tandem and molecular beam mass spectroscopy for interrogating gas phase chemistries occurring in multi-atmosphere environments.

Theoretical/Computational LTP Capabilities

- Aleph and EMPIRE: Massively parallel PIC-DSMC, extensive chemistry and photonic processes
- Aria: multiphase fluid simulation capability being extended to highly collisional plasmas
- 0D Global Modeling

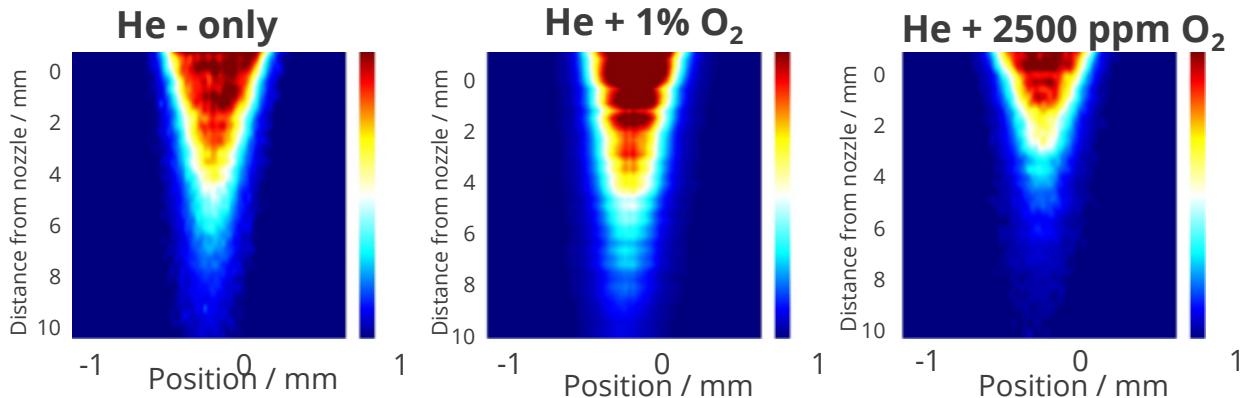
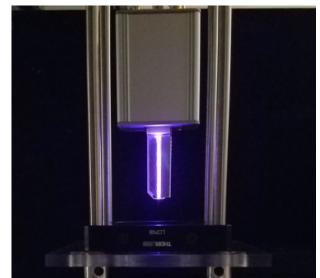


Propose a collaboration at: [www.sandia.gov/prf](http://www.sandia.gov/prf)

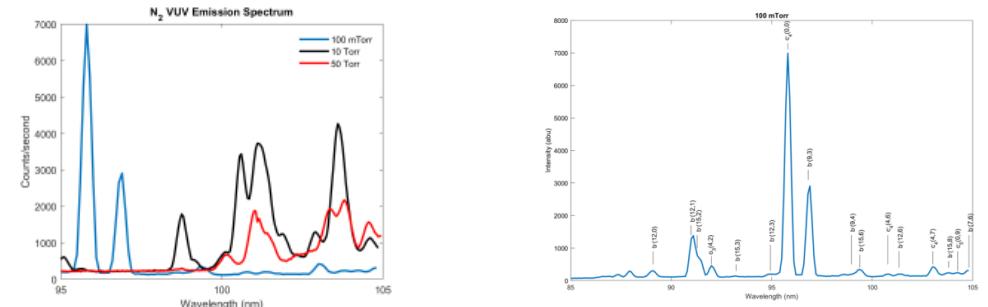
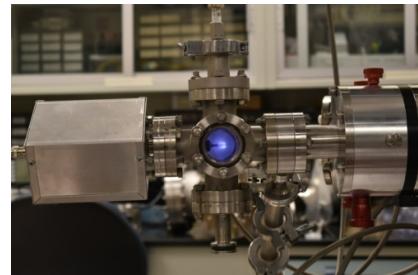
# Sandia PRF – Project Examples



**ps-TALIF atomic Oxygen**  
NCSU – Stapelmann, Myers,  
Barnat



**VUV N<sub>2</sub> spectrometry –**  
UNM – Lehr, Fierro, Smith, Yee

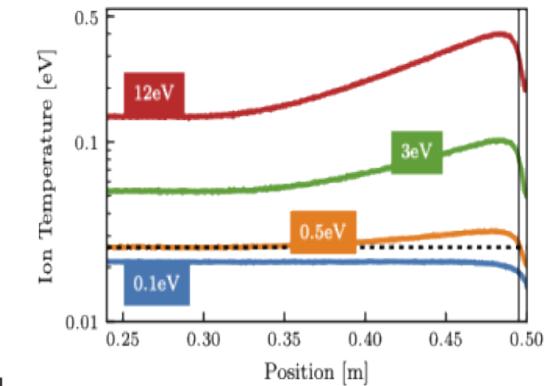
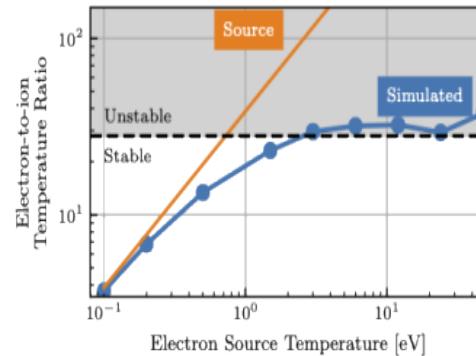


# Sandia PRF Project Examples (cont.)



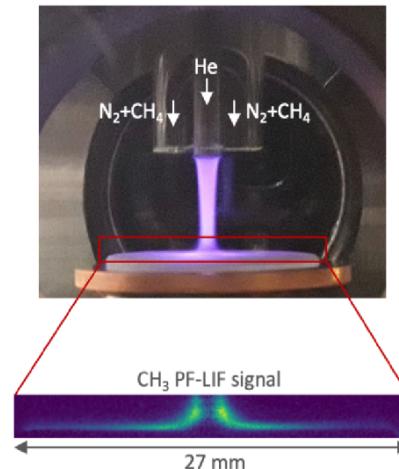
## PIC-DSMC Sheath Instability

U of Michigan – Baalrud, Beving, Hopkins



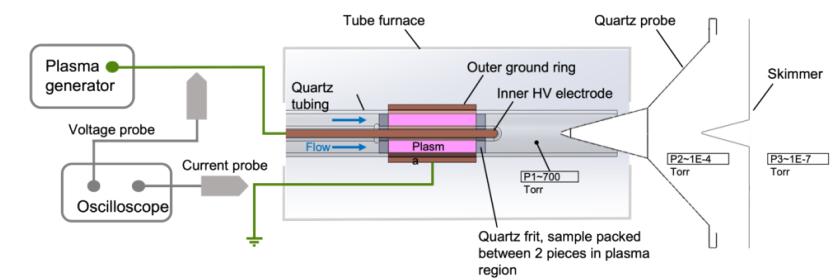
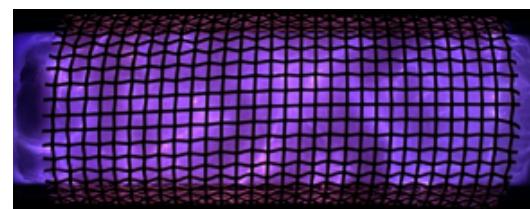
## CH<sub>3</sub> PF-LIF imaging in ns pulsed plasma discharges

OSU – Adamovich, Richards, Frank, van den Bekerom



## Molecular Beam Mass Spectrometry

Princeton University – Ju, Burger, Hansen



# Work with us: 3<sup>rd</sup> Facility Proposal Call



Propose a collaboration at: [www.sandia.gov/prf](http://www.sandia.gov/prf)

Open of PRF Proposal Call

October 12, 2021

Close of PRF proposal Call

December 17, 2021

External Reviews

~ 1 month

Notification of Principal Investigators

February 4, 2022

Call timing is aligned with PPPL PCRF

**Contact us to ensure projects are well-aligned with our capabilities:**

- Brian Bentz ([bzbentz@sandia.gov](mailto:bzbentz@sandia.gov))
- Jonathan Frank ([jhfrank@sandia.gov](mailto:jhfrank@sandia.gov))
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- Matthew Hopkins ([mmhopki@sandia.gov](mailto:mmhopki@sandia.gov))
- Christopher Kliewer ([cjkliew@sandia.gov](mailto:cjkliew@sandia.gov))
- Shane Sickafoose ([smsicka@sandia.gov](mailto:smsicka@sandia.gov))

# Acknowledgements



Sandia National Laboratories' Plasma Research Facility is funded by the U.S. Department of Energy's Office of Science, Fusion Energy Sciences.

