



# FACET-II

Facility for Advanced Accelerator Experimental Tests

# Experiment Safety Review and Work Release

FACET-II Science Workshop 2019

Christine Clarke  
FACET-II User Manager



# Outline

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- Roles and responsibilities
- Experiment design and safety review
- Work release
  - Experiment installation
  - Experiment beam time
- User safety training
- Site Access

# Roles and Responsibilities: FACET and Test Facilities Division

## Advanced Accelerator Research Department

- Organize and participate in science program aligned with HEP Roadmap
- Translate User needs to Test Facilities and Operations departments
- Maximize scientific output by organizing science workshops, collaboration meetings, etc.

## Test Facilities Department

- Assign User training to ensure User safety onsite
- Contribute to design of experimental equipment and manage safe and efficient installation
- Coordinate multiple groups during accelerator access periods

## FACET-II Operations Department

- Coordinate accelerator commissioning
- Develop new machine configurations matched to needs of experimental programs
- Create procedures for operators to ensure consistent delivery

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- Translate User needs to Test Facilities and Operations departments
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## Test Facilities Department **This talk mainly focuses on this and you...**

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- Contribute to design of experimental equipment and manage safe and efficient installation
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## FACET-II Operations Department

- Coordinate accelerator commissioning
- Develop new machine configurations matched to needs of experimental programs
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Responsibility for safety is with the Test Facilities Department  
(POC Christine Clarke)

## Roles and Responsibilities:

The PI (or designee) representing the E-XXX team:

- is responsible to satisfy all parties that the experiment is safe to operate and there are no radiation concerns
- is responsible to develop safety documentation and share it with Test Facilities staff
- is responsible to inform Test Facilities staff of any changes to the experiment (apparatus or procedures) that affect safety
- is responsible to ensure that any requests from SLAC for the purpose of increased safety are implemented
- is responsible to provide enough people to operate in a safe manner

# Experiment hardware development and safety review

SLAC

Design

- Users and TF staff develop hardware design and operating procedures
- TF staff identify safety training required
- TF staff provide information for Radiological Safety review
- TF staff coordinate Experiment safety review

Test Facilities manages the Users' installation work and aids the experimental design to ensure safety and productivity

# Current status

- We invited 7 experiments to begin the experiment review process in 2019

Experiment	Title	Status
E-300	Energy Doubling of Narrow Energy Spread Witness Bunch while Preserving Emittance with a High Pump-to-Witness Energy Transfer Efficiency in a Plasma Wakefield Accelerator	Review complete (2 conditions)
E-302	Transverse wakefields and instabilities in plasma wakefield accelerators	Review complete
E-303	Generation and Acceleration of Positrons at FACET II	
E-305	Beam filamentation and bright gamma-ray bursts	
E-310	Trojan Horse-II	
E-320	Probing Strong-field QED at FACET-II	
E-324	Optical visualization of beam-driven plasma wakefield accelerators	Review complete

# Some pointers

- If you are using a laser:
  - $10^{12}$  W/cm<sup>2</sup> limit for people to be present (prompt radiation concerns)
  - $10^{13}$  W/cm<sup>2</sup> limit for hitting vacuum components (ablation threshold for fs laser)
- Where can the beam go?
  - Need to understand whether the beam could strike anything that gives prompt radiation concerns for personnel in the gallery
  - Need to understand whether the beam could cause hot-spots that lead to personnel concerns in access
  - Need to understand if there is a potential for contamination
- We also consider pressure vessel safety, fire safety, electrical safety, oxygen deficiency hazard...
- Linac and experiment protection also important
  - Do not want an experiment to damage Linac or another experiment's apparatus



# Experiment hardware development and safety review

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## Set-up

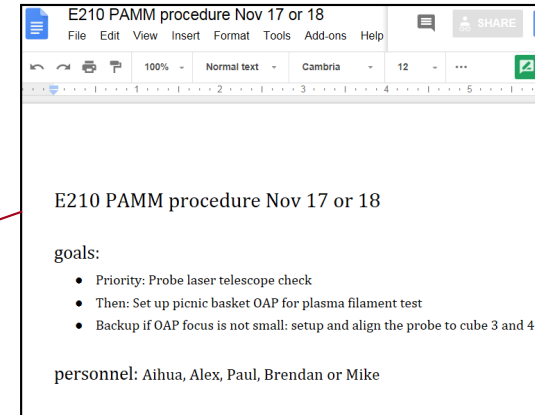
- TF staff ensure user safety training complete
- TF staff support users for hardware installation
- TF staff do installation planning and coordinate work release

Test Facilities manage the Users' installation work and aid the experimental design to ensure safety and productivity

# Work within FACET accelerator housing



# Work within FACET accelerator housing



**Thursday: Procedure for access**

# Work within FACET accelerator housing



E210 PAMM procedure Nov 17 or 18

goals:

- Priority: Probe laser telescope check
- Then: Set up picnic basket OAP for plasma filament test
- Backup if OAP focus is not small: setup and align the probe to cube 3 and 4

personnel: Aihua, Alex, Paul, Brendan or Mike

## Thursday: Procedure for access

FACET User PAMM Requests

1	2	3	4	5	6	7	8	9	10	11	12	13
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## Friday – Monday: Facility Staff review, Radiation Safety review

# Work within FACET accelerator housing



E210 PAMM procedure Nov 17 or 18

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## Monday: Schedule and controls emailed to workers and posted at site

FACET-II Science Workshop 2019

Access Schedule for March 9th

Top priority: E-200 and E-225 laser work

March 9th, 2016 (Wednesday)

Start Time	Duration	Activity	Personnel	Work Location	Hazard/Control/Comments
6:00	1	Survey	RFFO	Sec 19&20	
7:00	0.5	Vent	Juan	IP1	Vent Kraken first and then plasma OR remove Be window and vent whole area at once.
7:30	0.5	Establish HeNe	Mike	IP1	
8:00	1	Change flanges on Picnic Basket	Juan, Mike	IP1	
8:00	2	Align OTR cameras	Mike, Brendan, Ken	IP1	
10:00	1	Adjust oven mover LVDT	James Bong	IP1	
10:00	1	Replace DSHM	Brendan	IP2	
11:00	4	Axicon and kinofilm alignment, rail camera	Mike, Ken, Brendan	IP1	Class 4 laser mode. QLOs only. Laser goggles required. Verify optics installed are the approved optics and verify beryllium window safety.
14:00	0.5	Replace dump table screens	James	Dump	
15:00	6	Ax ling system, plasma length diagnostic. Pump down, ldy and final checks (i.e. check all cameras functional and aligned)	Spencer, Antoine, James	IP1	Class 4 laser mode. QLOs only. Laser goggles required.
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# Work within FACET accelerator housing



**Tuesday – Wednesday:  
Work done**



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**Friday – Monday:  
Facility Staff review,  
Radiation Safety review**

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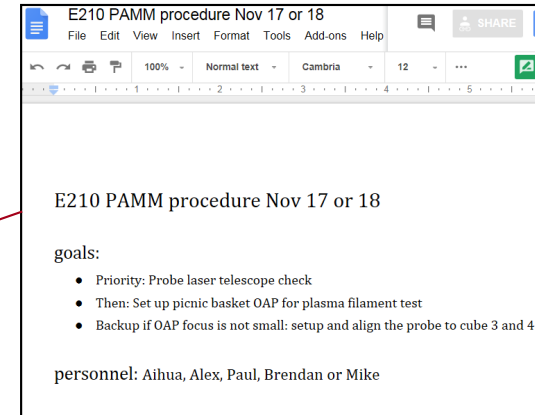
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controls emailed  
to workers and  
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# Work within FACET accelerator housing



**Wednesday: report by users, Update procedure**



**Thursday: Procedure for access**



**Tuesday – Wednesday: Work done**



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SLAC

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## Set-up

- TF staff ensure user safety training complete
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## Review

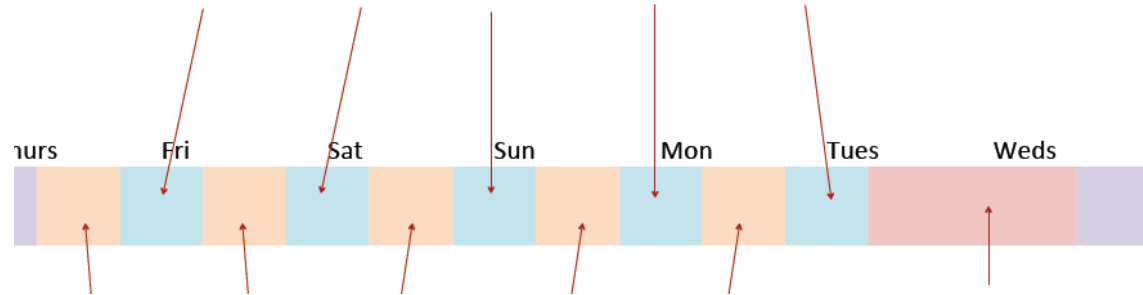
- TF staff confirm installation matches that approved in review
- TF staff review user installation for readiness for beam time

Test Facilities manage the Users' installation work and aid the experimental design to ensure safety and productivity



# Beam time authorization

Delivery to experiments ~ typically 12 hours/day



Machine maintenance, development of new beam configurations and set-up for experiments during day shift

Scheduled access to FACET to switch experiments, install upgrades and troubleshoot issues

- Users provide procedures for their beam time + previous shift analysis
  - Reviewed by Advanced Accelerator Research department to ensure beam time is used effectively
  - AAR department relays beam needs to Operations department
  - Operations department develops beam configuration and procedures
  - Hardware/support needs are assessed and provided by Test Facilities
- During shift: Regular contact between users and AAR department staff
- After shift: Users post shift report to e-log giving immediate feedback

FACET&TF manage the users such that they are productive in beam time

## If you take away anything today...

- The one message I want you to have is that all work whether with experiment set up or with experiment operation with beam...
- You need to follow a reviewed and approved procedure
- These processes and advice on writing procedures is in the FACET FAQs in the [Pre-PAMM guide](#) and [Guide to Beamtime](#)

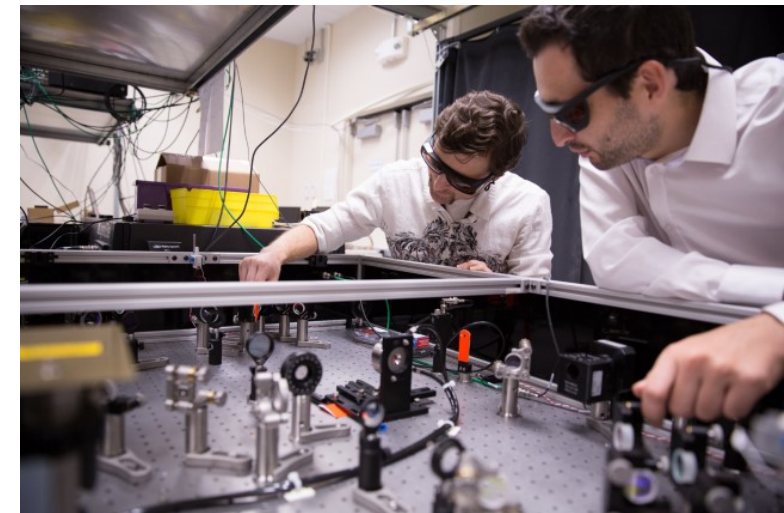
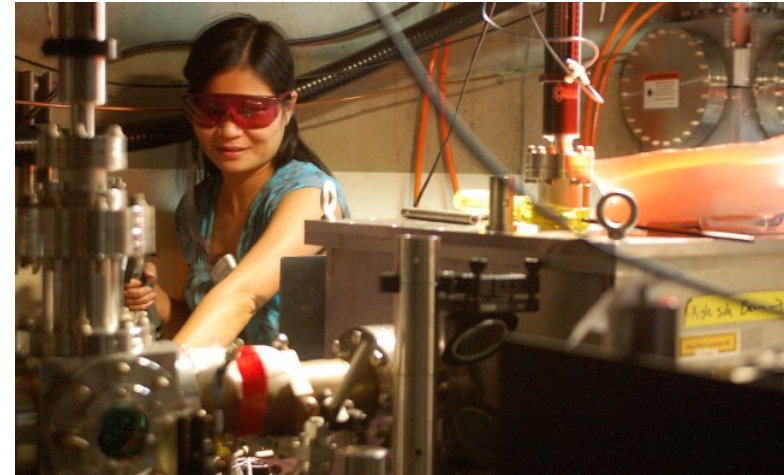
# FACET User training example

Training required to set up and operate experiments:

- Course 219 - Environmental Safety and Health
- Course 115 - General Employee Radiation Training
- Course 120 - Work Planning and Control Overview
- Course 116+PRA - Radiation Worker 1 Training
- Course AD103 – FACET Orientation
- Course AD112 – Accelerator Control Room Orientation

Additional training to be a Class 4 laser operator:

- Course 253 - Laser Worker Safety Training
- Course 131 - Laser Accidents/Lessons Learned
- Course 253ME - Laser Worker Baseline Medical
- Course 253PRA - Laser Alignment Safety Practical



PI/POC: ensure team members complete necessary training

# Digression from safety: User Onboarding and Site Access

## Team Members

- Your PI has the instructions for how to register
- Always inform me of your travel plans
- Check the arrival procedure page on the FACET website before you leave home
- Be aware that requirements for site access can change!

## VUE Center

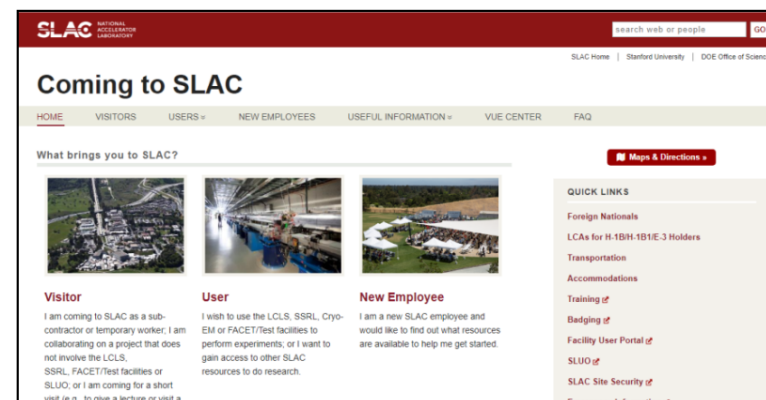
- The PI gives me a list of team members that I pass onto the VUE center
- They assign SLAC IDs when users register
- They manage DOE User Facility User Agreements to ensure there is a current agreement before you arrive
- They ensure site access compliance to DOE orders
- When you arrive, they will issue badge and dosimetry

## Arriving Procedures for Users

Visitors: If you are just visiting SLAC and are not a user (that is, someone affiliated with an accepted experiment at FACET & TF), you need to be invited by a SLAC employee who will arrange the site visit by filling out the [site entry request form](#). ID will be required by the security guards on the Sand Hill Gate.

First-time Users must first get registered and complete the online training courses prior to arrival at SLAC. Follow the instructions [here](#).

[https://portal.slac.stanford.edu/sites/ard\\_public/facet/newnav/Pages/tf/users/ArrivingProcedures.aspx](https://portal.slac.stanford.edu/sites/ard_public/facet/newnav/Pages/tf/users/ArrivingProcedures.aspx)



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PI/POC: ensure that your team bring their documentation for check-in!



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# Questions

FACET-II Science Workshop 2019

