State of the Accelerators

Thinking about beam, with fingers crossed for the cryoplant and SC electron gun.

All machines are still currently off while several major tasks are underway:

- LCW restoration S10-S30 – S25/S26 outage began Monday 5/1, recovery begins possibly this afternoon, but more likely tomorrow – so let's plan on beginning recovery on Monday 5/8
  - Schedule for other sector pairs will be developed soon, based on lessons learned from this one

- Cryoplant 1 cooldown is underway, should reach stable 50K today (limited by open ODH work control form)
  - Preparing for insulating vacuum leak checks – will have idea on path forward by tomorrow
  - Follow along here! https://pswww.slac.stanford.edu/swdoc/ecs_dashboards/cryomodule.html

- PPS and BCS testing wrapping up! Operations is working to close out things like the RSWCFs*

- AD goal to recover SC gun targeting Thursday 5/11 (more about this later...)

RSWCF = Radiation Safety Work Control Form

Work Schedule and Planning

LAF PAMM finishing today

No access to accelerator areas next week except to close out work permits

Next PAMM in 2 weeks

- Please continue to add your jobs into the appropriate buckets

- Benign SW jobs handled on case-by-case basis.

Start Date ↓⹀	End Date	Program	Machine Status	Description
08/01/2023	09/16/2023	All Accelerators	Downtime	August/September downtime (LCLS SC, FACET, LCLS C
05/30/2023	06/01/2023	All Accelerators	PAMM	5/30-6/1 PAMM
05/16/2023	05/18/2023	All Accelerators	PAMM	5/16-5/18 PAMM
05/08/2023	05/12/2023	All Accelerators	Downtime	LCLS-II, FACET, and LCLS work for the week of 5/8-5/12.
05/02/2023	05/04/2023	All Accelerators	PAMM	5/2-5/4 PAMM

Controls work or other things that may impact you

- Site air issue Wednesday, could impact SC linac valves, backup system is under repair so single point of failure

- Another one (of the 6) lcls archive appliance getting upgraded to RHEL7 ~soon~

Plan for upcoming weeks

From Sharon's Wednesday Downtime Planning meeting

Dashboard: https://slac.sharepoint.com/sites/AD/committees/iwp/Pages/IWP-Dashboard-2022-2023-Downtime.aspx

May

Monday	Tuesday	Wednesday	Thursday	Friday	Sat/Sun
05/01/2023 • Cryoplant – LINAC to 175K • LINAC West ODH Cert • LINAC Substation Maintenance – *K13 (S25&S26) Power Outage tentative*	**05/02/2023** • PAMM • LINAC Substation Maintenance – *K13 (S25&S26) Power Outage tentative* • Cryoplant – LINAC 150K to 130K • LINAC West ODH Cert	**05/03/2023** **Downtime Planning Mtg** • PAMM • LINAC Substation Maintenance – *K13 (S25&S26) Power Outage tentative* • Cryoplant – LINAC 100k to 4K • LINAC West ODH Testing from 12pm	**05/04/2023** • PAMM • Cryoplant – LINAC 100K to 4K, Leak Test • LINAC Substation Maintenance – *K13 (S25&S26) Power Outage tentative*	**05/05/2023** • Cryoplant –LINAC 100K to 4K, Leak Test	**05/06 &05/07** • Cryoplant – Fill
05/08/2023 • Cryoplant – Fast Cool Down • LCLS SC – Gun Restart	**05/09/2023** • Cryoplant – Fast Cool Down • LCLS SC – Gun Restart	**05/10/2023** **Downtime Planning Mtg** • Cryoplant – Fast Cool Down • LCLS SC – Gun Restart	**05/11/2023** • Cryoplant – Fast Cool Down • LCLS SC – Gun Restart	**05/12/2023** • Cryoplant – Fast Cool Down • LCLS SC – Gun Restart	**05/13 &05/14** • Cryoplant – Fast Cool Down • LCLS SC – Gun Restart
05/15/2023 • Cryoplant – 2K • LCLS SC – Gun Restart	**05/16/2023** • PAMM • LINAC Substation Maintenance –*TBC*	**05/17/2023** **Downtime Planning Mtg** • PAMM • LINAC Substation Maintenance –*TBC*	**05/18/2023** • PAMM • LCLS SC Restart • LINAC Substation Maintenance –*TBC*	**05/19/2023** • LCLS SC Restart Program	**05/20 &05/21** • LCLS-SC Restart

Schedules in Development – subject to change

Turning on the **SC** Gun

SC Commissioning Calendar updated

https://calendar.google.com/calendar/u/0/embed?height=600&wkst=1&mode=WEEK&bgcolor=%2300CCDD&ctz=America/Los_Angeles&title=LCLS+SC+Linac+Schedule&src=Z285ZHZ0MmZqOWc2OTUxcXZpcDA1cGJpMzBAZ3JvdXAuY2FsZW5kYXIuZ29vZ2xlLmNvbQ&src=bnE3ajQzdHRicjY2cGU4NzFyMmVtZ2ZvcjBAZ3JvdXAuY2FsZW5kYXIuZ29vZ2xlLmNvbQ&color=%237986CB&color=%23009688

- Let me know ASAP if there is any problem being ready for these dates, or if you are not available for the days Yuntao has you listed (Garth, Carolina, Sonya)

Turning on the **SC** Gun

Getting it ready to go if the SC linac cooldown goes to optimistic plan

- The electron source for the superconducting linac
  - Some info here: https://www6.slac.stanford.edu/news/2019-05-30-slac-fires-electron-gun-lcls-ii-x-ray-laser-upgrade
- How it works
  - Hit a cathode with laser pulses, get electrons, send them away at 700 keV. Electrons pass through a buncher to get the longitudinal structure needed by the linac, can be accelerated up to <1 MeV.
    Magnets shape and steer the beam, and the beam position, intensity and profile are measured with diagnostics.
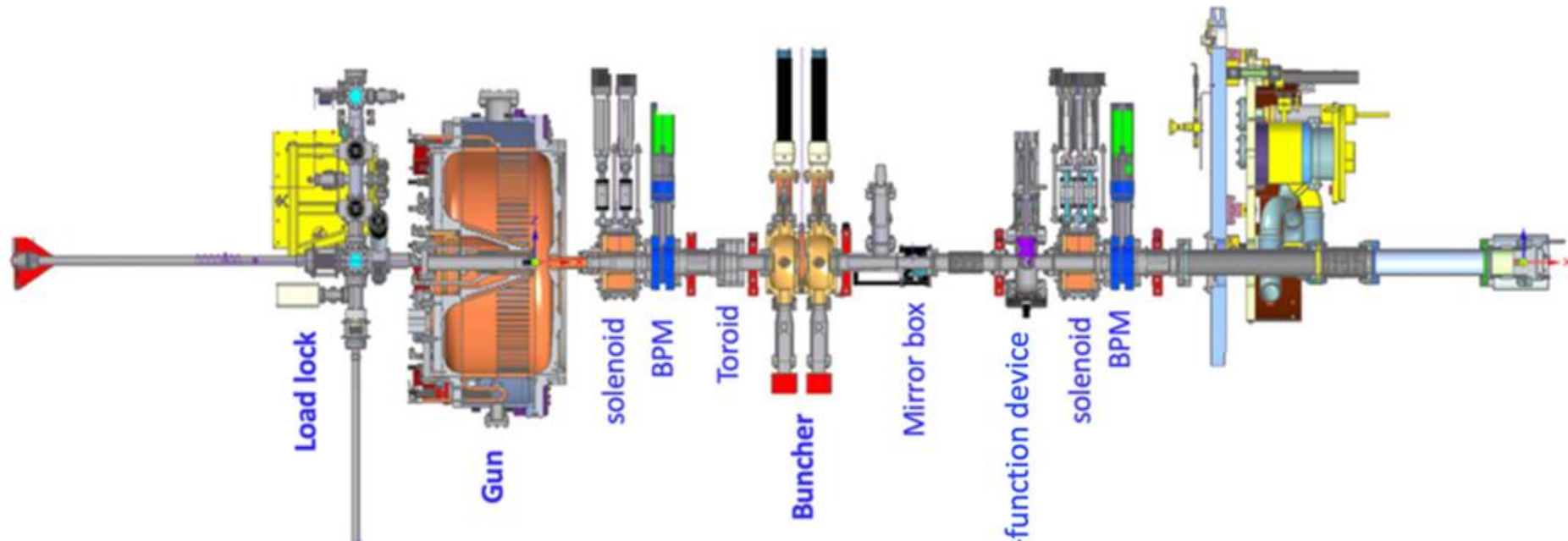
Turning on the **SC** Gun

Getting it ready to go for if the SC linac cooldown goes to optimistic plan

- Many safety systems will prevent this low-energy beam from being sent down the pipe…

- This means to turn the SC Gun on we need these ready:
  - PPS, BCS, MPS (personnel protection, beam containment, and machine protection systems)
    Note: there is a single PPS zone from S0 to BSY, and their official beam stopper is the BSYdump besides the DIAG0 dump, so all systems need to be certified and operational.
  - Laser and timing systems
 - Rf, magnets and cooling water, diagnostics

    … so basically everything!

    Good point to remind everyone we're moving out of this extended downtime and back into operation :)

Turning on the **NC** Gun

There is a possibility it was damaged, so finding that out now is better than later!

- After the winter break, ion pumps that keep the area at very high vacuum had stopped working, so the vacuum pressure rose

- It's possible this damaged the photocathode
  - Means we can't make (enough or nice) electron beam

- Only way to tell is to turn it on and see...
  - Shawn is optimistic the cathode is fine, but if it's not it will take time to do 'laser cleaning' or replace the cathode (big job)

- Don't have a scheduled date yet...

Reached > 2e-6 Torr

Normally < 2e-10 Torr
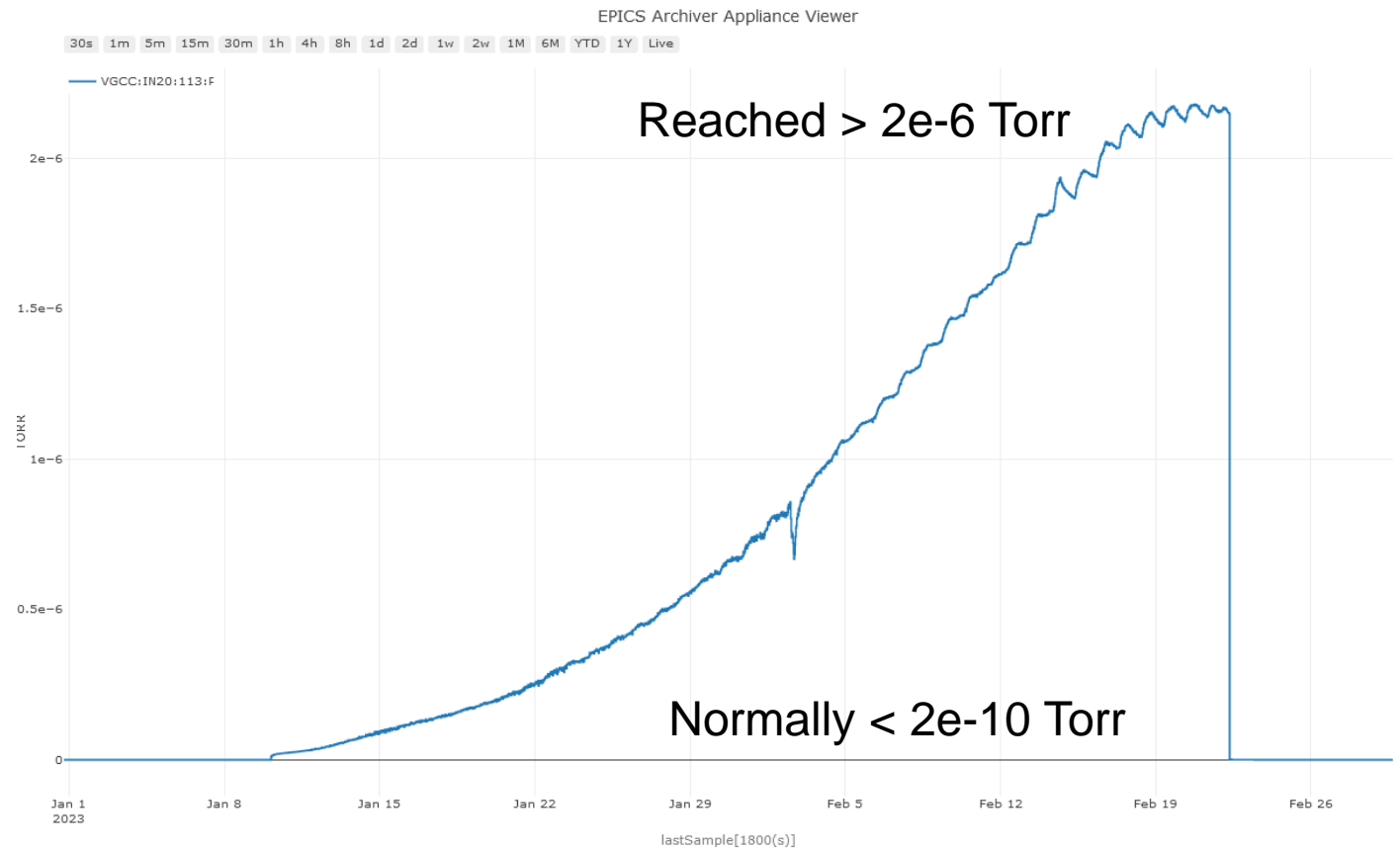
Other Reminders – BSA PVs!

The LCLS Directory Service was(?) picking up a lot of broken BSA PVs on Production

- The BSA module was updated with fixes, all client IOCs need to be updated to load the new version
- **Request to put TPRs in SC mode for testing today?**

- So - how do we test that everything is working correctly, and roll out the changes?

If you have any issues, reminders, requests, or did-you-knows to include in this meeting send them to me!

Welcome Chris Myers!

- Originally from Lafayette, Louisiana

- Graduated from LSU in 2019 with a Bachelor's degree in Mechanical Engineering

- Worked as a Physics TA for 3 years during college

- Spent a summer as a TA for Duke University at PARI (Pisgah Astronomical Research Institute). Basically, a counselor at Space Camp

- Worked as a mechanical engineer in Baton Rouge, Louisiana from 2020-2021

- Worked as a data analyst for IBM from 2021-2022

- Avid backpacker, climber, weightlifter, and gymnast

- **Just happy to be here :)**

Special Presentation

Jesse Bellister & Tasha Summers - Design and implementation of a new SLAC Alarm Manager

The old EPICS ALH, currently used at SLAC to view the alarm tree, is aging and no longer being maintained. A new system designed for availability, integrability, and extensibility is required. The new alarm system fulfils those requirements by blending the Phoebus alarm server with existing open-source technologies for deployment, management, and visualization. An overview of this architecture will be presented, along with a live demo of the system deployed on the S3DF with copies of both the Cryoplant and LCLS alarm configurations. Details on the Python UI, Grafana log dashboard, and configuration file management will be described.

Comments, feedback, and suggestion are encouraged!