2024 NSF RESEARCH INFRASTRUCTURE

WORKSHOP

MARCH 26 - 29, 2024 • TUCSON, ARIZONA

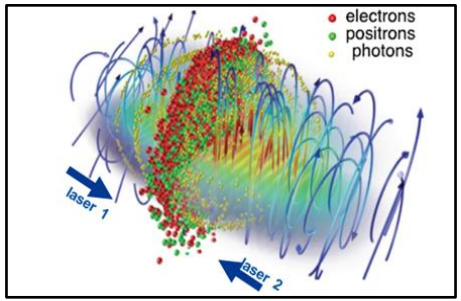
NSF OPAL RI-1: Mid-scale RI Panel

Elizabeth Hill, Project Manager

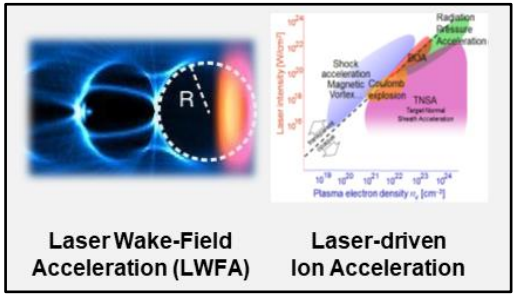
Image Credit: Vera C. Rubin Observatory, CTIO/NOIRLab/DOE/NSF/AURA T.A. R, Richard F. Caris Mirror Lab/Gabrielle Perez

NSF OPAL is a RI-1 project to design a 25-PW laser facility to address four areas of frontier science

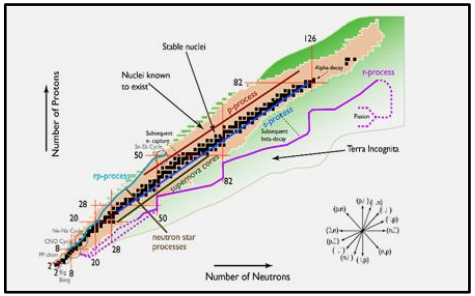
High-Field Physics and Quantum Electrodynamics (HFP/QED)



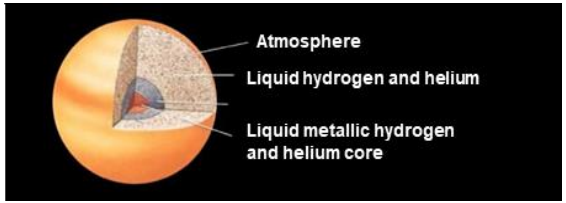
Particle Acceleration and Advanced Light Sources (PAALS)



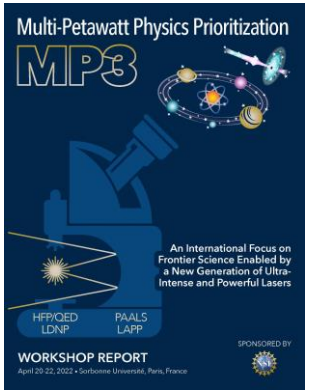
Laser-Driven Nuclear Physics (LDNP)



Laboratory Astrophysics and Planetary Physics (LAPP)



The 2022 Multi-Petawatt Physics Prioritization (MP3) workshop identified opportunities in four areas of frontier science (https://arXiv.org/abs/2211.13187)



UNIVERSITY OF ROCHESTER OPAL

UNIVERSITY of ROCHESTER · University at Buffalo · UNIVERSITY OF MARYLAND · UCI University of California, Irvine · UNIVERSITY OF NOTRE DAME · UNIVERSITY OF MICHIGAN · THE OHIO STATE UNIVERSITY · Plymouth Grating LABORATORY

NSF OPAL PEP development and lessons learned

PEP Development Approach

- The NSF OPAL Project Execution Plan was built on the previous University of Rochester experience with the design and build of similar scale laser facilities

Lessons Learned/Advice

- Utilize NSF resources
  - NSF has an excellent set of webinars walking you through some of the key processes
  - The Proposal & Award Policies & Procedures Guide (PAPPG) and Research Infrastructure Guide (RIG) are your friend
- Keep the scope of your project in mind
  - NSF OPAL is an RI-1 design project with the goal of receiving a RI-2 Construction project; do not include details that will be relevant to the constructing effort
- Less is more; do not put in a lot of extraneous scientific detail
- Remember that the PEP is a living document
  - It is okay to change/improve your approaches

The NSF OPAL Project is using a scaled and scalable approach to Earned Value Metrics

Earned Value Metrics – methodology

Actual Costs

Each L2 WBS and subaward are assigned a separate account for cost tracking purposes. Accumulated costs are reconciled monthly to validate reasonableness. Action is taken to process corrections, as identified.

UR Account	WBS	Description
GR534260		Project Office
GR534261		*Contingency*
GR534294	1.1	*SUNY Buffalo: Co-PI for LAPP*
GR534295		*UC Irvine: Co-PI for PAALS*
GR534298		*Notre Dame: Co-PI for LDNP*
GR534262	1.2	Front-end Systems
GR534263	1.3	Beamlines
GR534264	1.4	Pumps
GR534265	1.5	Compression & Beam Transport
GR534266	1.6	Experimental Systems
GR534267	1.7	Diagnostic Development
GR534268	1.8	Controls & Information Technology
GR534269	2.1	Actively Cooled Disk Amplifier
GR534300	2.2	Grating Development (PGL)
GR534270	2.3	Large Aperture Crystals
GR534296	2.4	U Maryland: Focal Intensity Diagnostic
GR534297	2.5	U Michigan: Radiation Shielding
GR534299	2.6	Ohio: Liquid Crystal Targets & Plasma Mirrors

Schedule Statusing

Each WBS lead is responsible to report progress toward completion of their respective L2 body of work. The lead reports status of detailed activities at least monthly by logging % complete, actual start date, and projected completion date.

WBS	Task Description	% Complete	Baseline Start Date	Actual Start Date
1.1.4.1.1.2	Develop Day 1 Requirements: FS#1 PAALS	10	10/02/23	10/02/23
1.1.4.1.1.3	Develop Day 1 Requirements: FS#2 HFP/QED	10	10/02/23	10/02/23
1.1.4.1.1.4	Develop Day 1 Requirements: FS#3 LAPP	10	10/02/23	10/02/23
1.1.4.1.1.5	Develop Day 1 Requirements: FS#4 LDNP	10	10/02/23	10/02/23

Earned Value

The project budget / schedule defined within the PEP is used to compare against actual costs and reported progress. Results are reported to NSF monthly.

$ in thousands

WBS	Description	BCWS (PV)	BCWP (EV)	ACWP (AC)	CV CV=EV-AC	SV SV=EV-PV	CPI CPI=EV/AC	SPI SPI=EV/PV
1.1	Project Office							
1.2	Front-end Systems							
1.3	Beamlines							
1.4	Pumps							
1.5	Compression & Beam Transport							
1.6	Experimental Systems							
1.7	Diagnostic Development							
1.8	Controls and Information Technology							
2.1	Actively Cooled Disk Amplifier (ACoDA)							
2.2	Grating Development (Sub: PGL)							
2.3	Large Aperture Crystals							
2.4	Focal Intensity Diagnostics (Sub: UMD)							
2.5	Liquid Crystal Devices (Sub: OSU)							
2.6	Radiation Shielding (Sub: UMich)							

Lessons Learned

- Make sure the first three to six months of your schedule is detailed and reasonably time-cost loaded
- Navigating multiple different University invoicing systems will always be a challenge
- Earned Value metrics will be ‘bad’ for the first few months; it is important to review the variance reports to ensure that the variances are from expected sources (i.e. invoice lags)


90
809