Ongoing Particle Accelerator Upgrade Projects across the World

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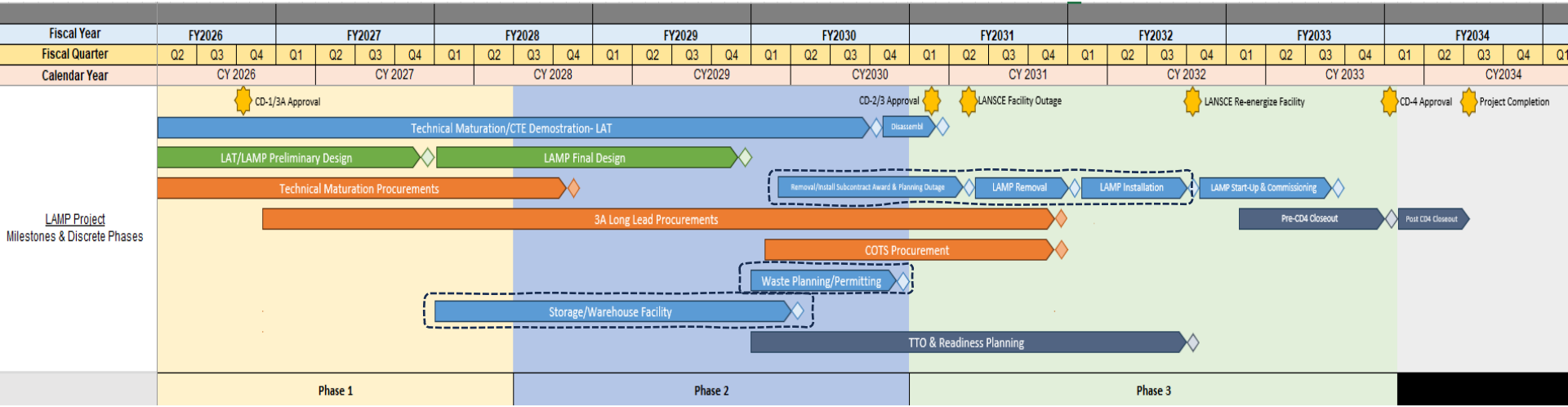
Managed by Triad National Security, LLC, for the U.S. Department of Energy's NNSA.

Project Schedules for Particle Accelerator Upgrades

Accelerator Upgrade Project	Dark Time Start / Duration
LAMP (Los Alamos National Laboratory, New Mexico)	2031; 18 months
NSLS II (Brookhaven National Laboratory, New York)	2036?
ALS-U (Lawrence Berkeley National Laboratory, California)	10/2027-07/2029 ; 21 months
ALBA II (Barcelona, Spain)	2030-2031
Siam Photon Source (Thailand)	2032-2033
Elettra 2.0 (Trieste, Italy)	07/2025 – 01/2027
SLS 2.0 (Paul Sherrer Institute (PSI), Switzerland)	09/2023 – 01/2025 (phase II by 2028)
PETRA IV (Germany)	2030-2032
LCLS II – HE (SLAC, Stanford, California)	Partial shutdown, ongoing?

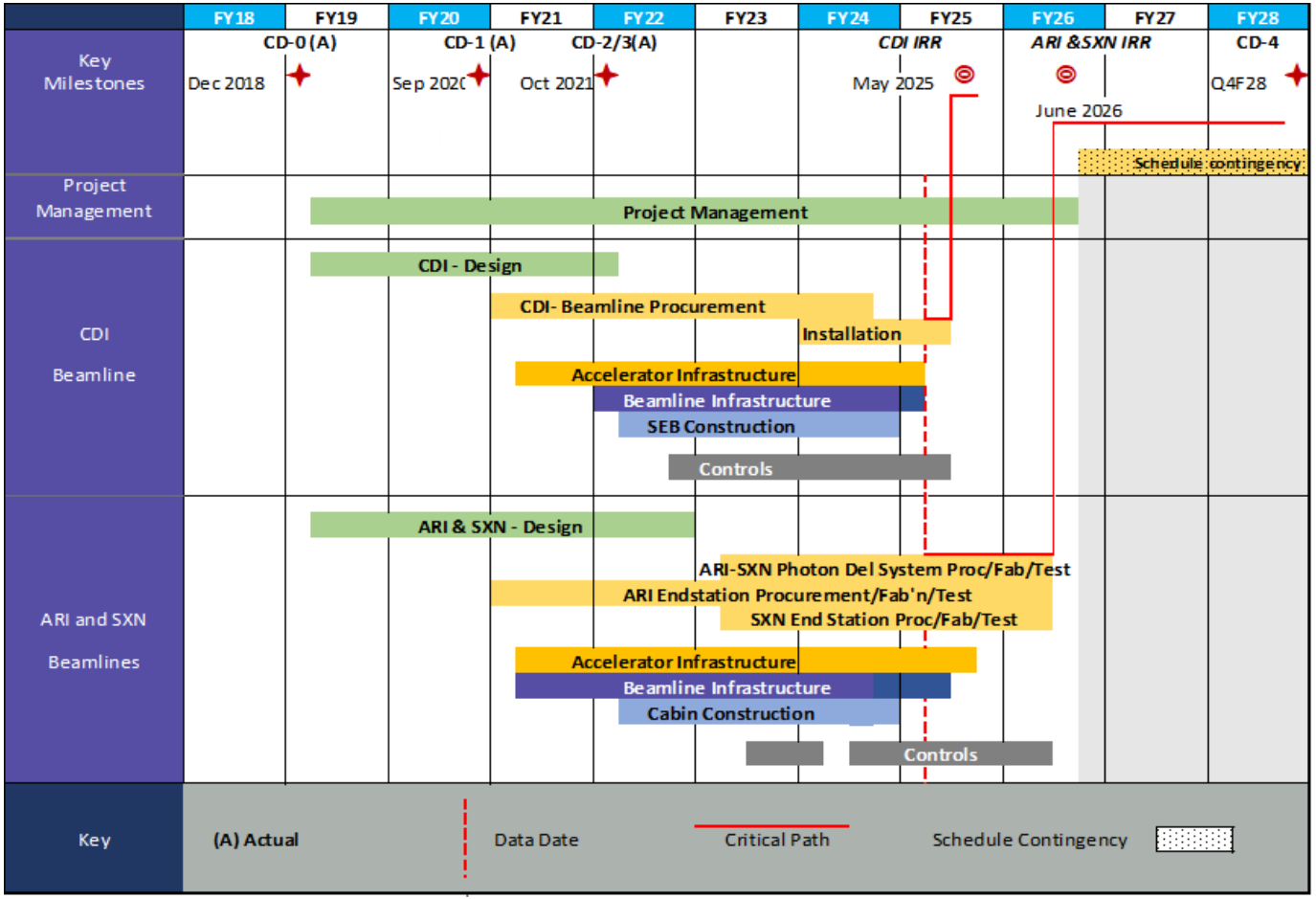
LAMP (LANSCE Accelerator Modernization Project)



- **Outage Planning Period**: 15 months
- **Outage Period**: 18 months
- **Projected R&I Discrete Cost**: $131.2M
- **Execution Method**: LANL Technicians & Specialized Subcontractors
- **Notional (CD-1) Oversight Staffing Needs**: 20-25 FTE
- **Tech Maturation/CTE Demonstration**: See Tyler Thornton's poster

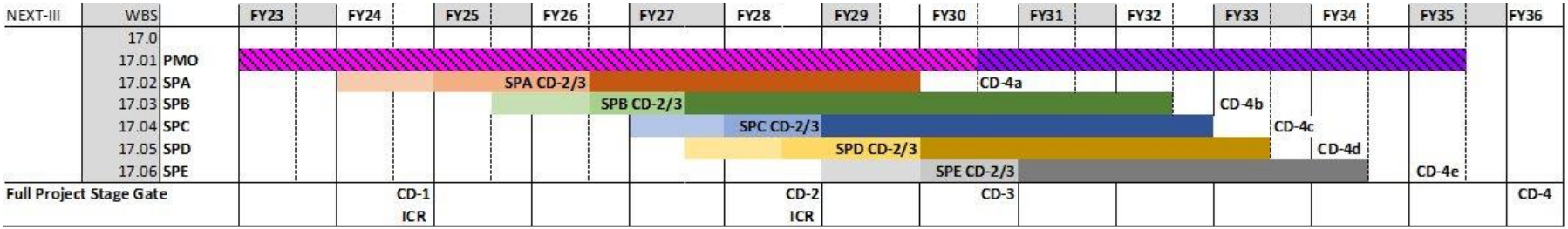
BNL – NSLS-II Schedules

NEXT-II



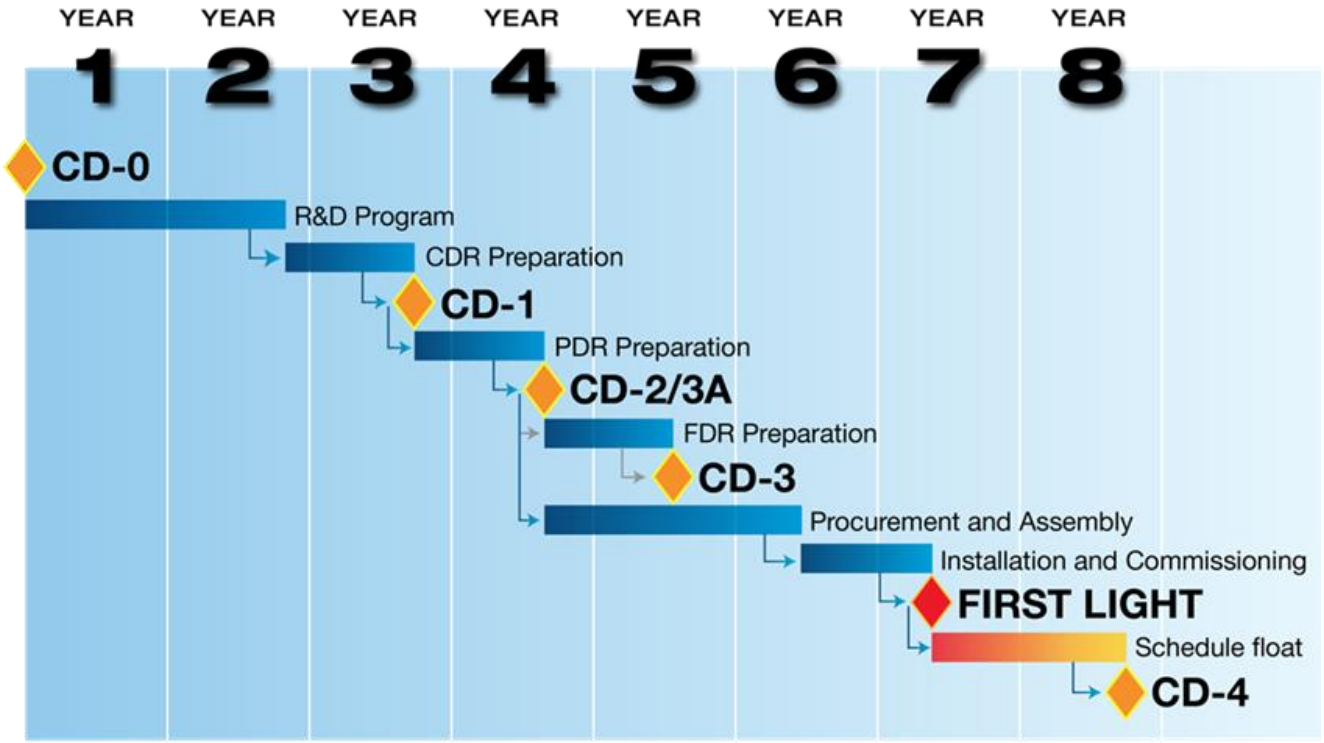
BNL – NSLS-II Schedules

NEXT-III

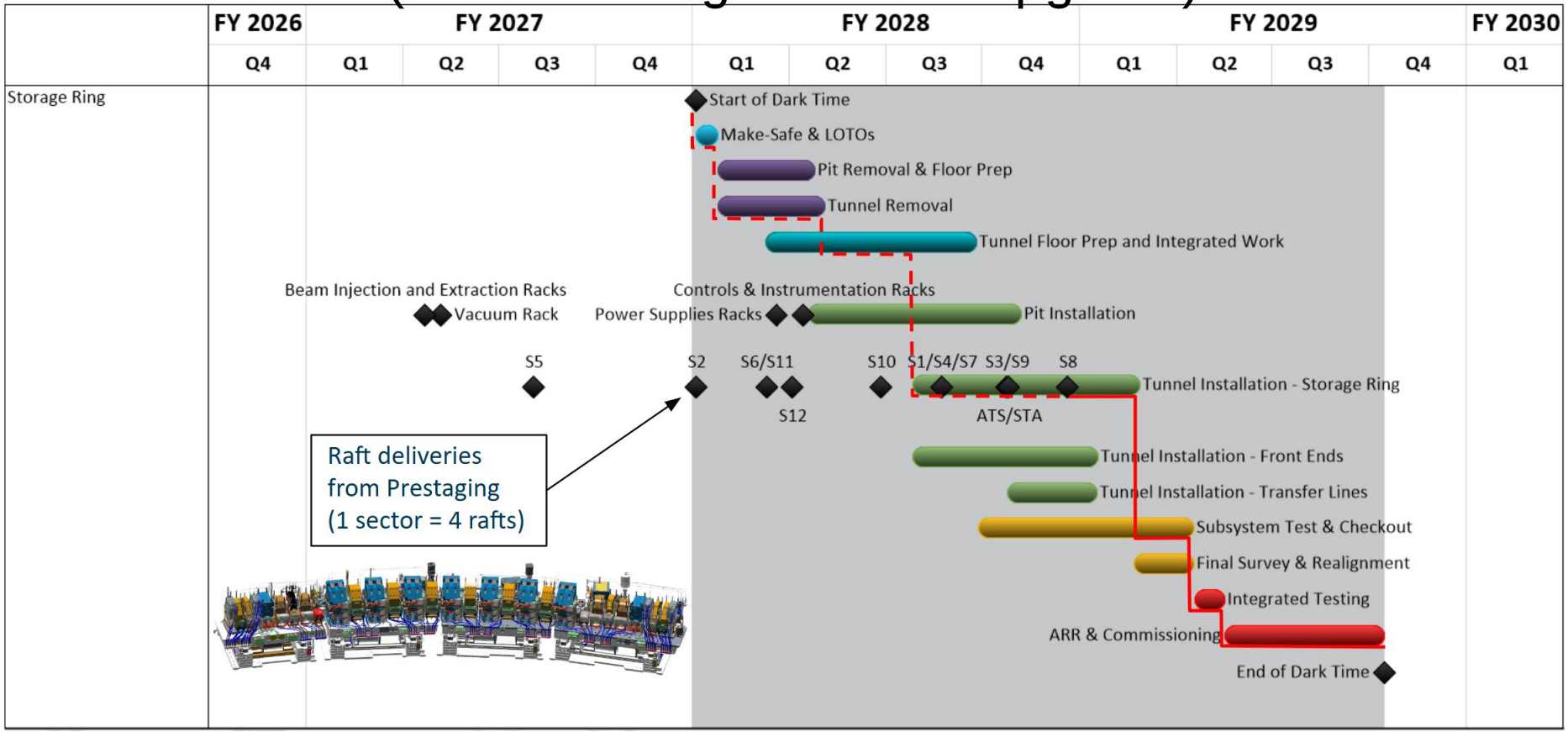


BNL – NSLS-II Schedules

NSLS-IIU – could start in FY27 or FY28



LBNL: ALS-U (Advanced Light Source Upgrade)

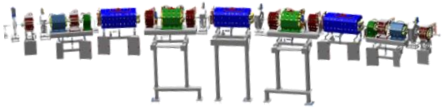


ALS-U - Replace one accelerator with two new ones

PDR 06/2019 | FDR 07/2020 | We are here May 2026 | ARR 02/2027 | 10/2027 | Start Install 05/2028 | Start Comm. 04/2029 | 07/2029

Preliminary Design | Final Design | Installation (6 years) | Testing | Commissioning | Dark Time (21 month)

ACCUMULATOR RING (AR)* | **STORAGE RING (SR)**



Add 3-bend achromat to the injector complex

Replace the existing storage ring with a multibend achromat
36 bends → 108 bends

Future beam more than 100 times brighter

*T. Griesemer - Session 2

The Plan

ALBA II

2026	2027	2028	2029	2030 - 2031

PG01 Experiments

- Design — **CODI** — Procurement
- **3SBAR** — Design — **CORUS** — Procurement
- Design & Procurement — **MSPD2** — Installation & Commissioning
- Design — **CALIMA** — Procurement
- Pre-assembly
- Prototypes and Design — CfT & Procurement
- Series SAT

Installation — Commissioning

Installation — Commissioning

Installation — Commissioning

Installation & Commissioning

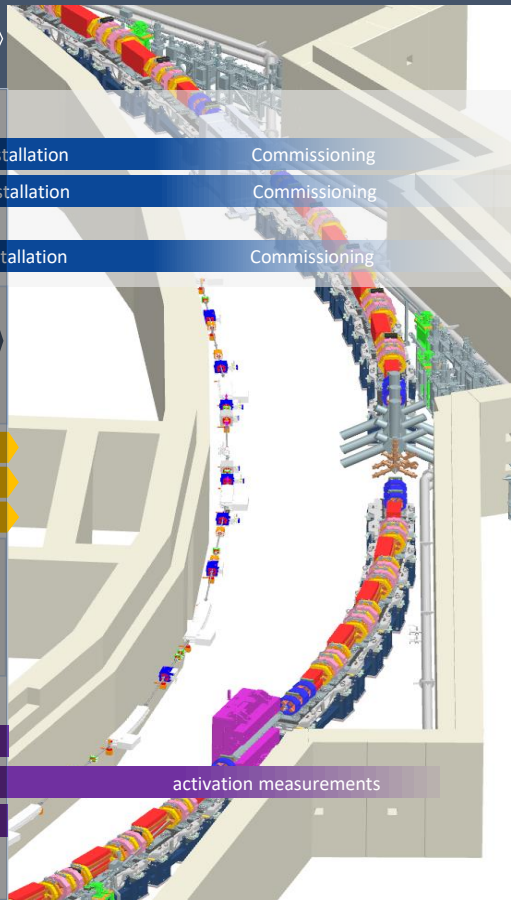
PG02 Accelerator

- COMPUTING Infrastructure
- Core DATA Services
- Scientific DATA Processing & Analysis

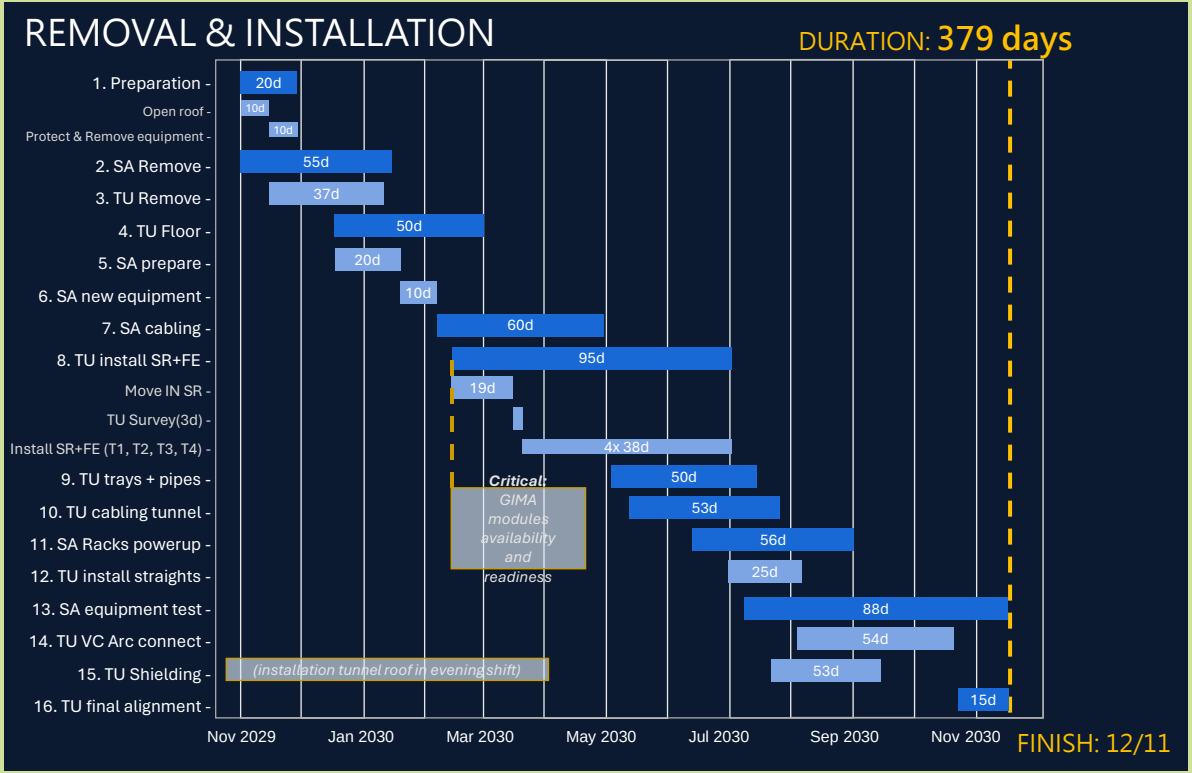
PG03 Computing & Data

- Temporary A and B **BUILDINGS**
- Photon Transfers **Structures**
- PRISMA **LABORATORIES**
- CODI, CORUS and FOCUS **Buildings**

- CDB Created — Tooling, Storage, logistics — **LOGISTICS & STORAGE** — logistics, controlling execution
- Inventory & strategy definition — Detailed planning, contracts — **RECYCLING & DECOMM.** — Execution — activation measurements
- Tasks Schedule — **REMOVAL & INSTALLATION** — Execution
- Labs & Assembly areas — **ASSEMBLY & TESTING** — Equipment SAT & pre-assembly

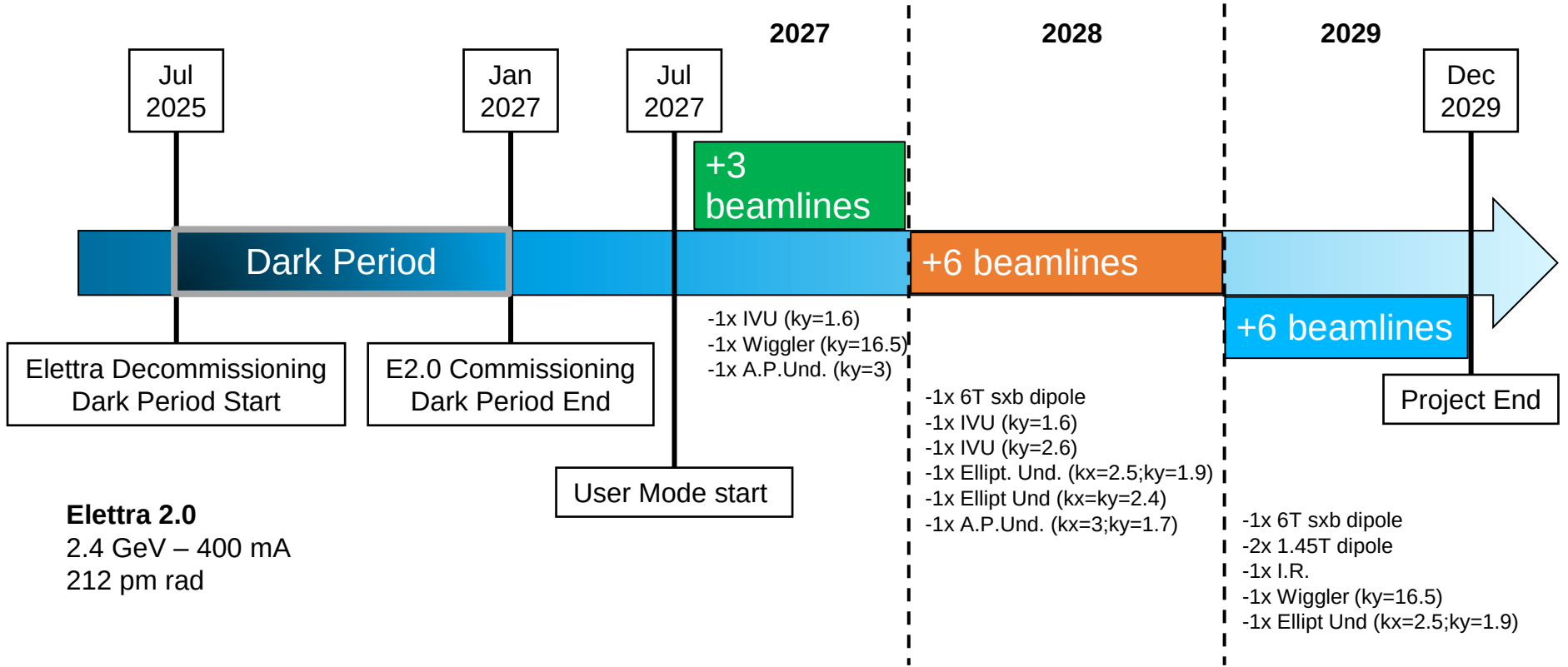


Dark period Nov29-May31 (SR shutdown to BL start commissioning)

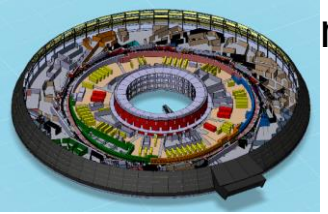


Siam Photon Source- II (SPS-II) Project Schedule

Elettra 2.0 – Project Schedule

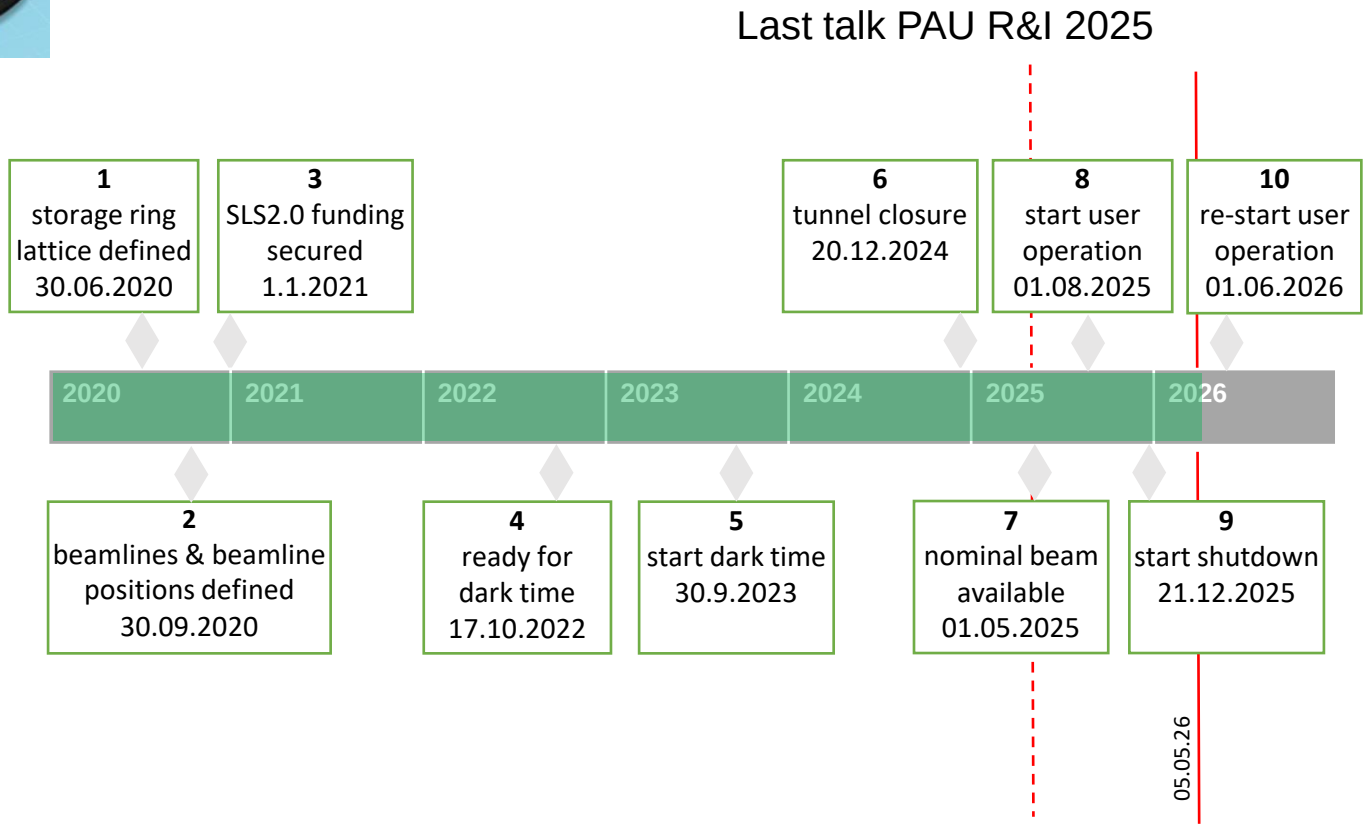


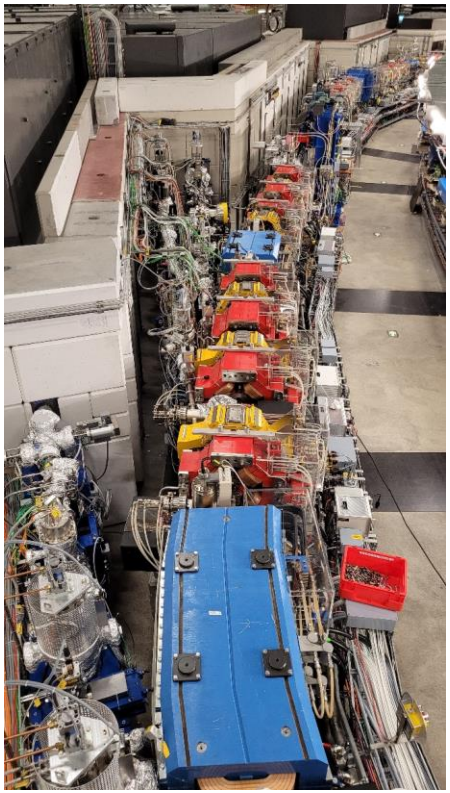
Elettra 2.0
2.4 GeV – 400 mA
212 pm rad



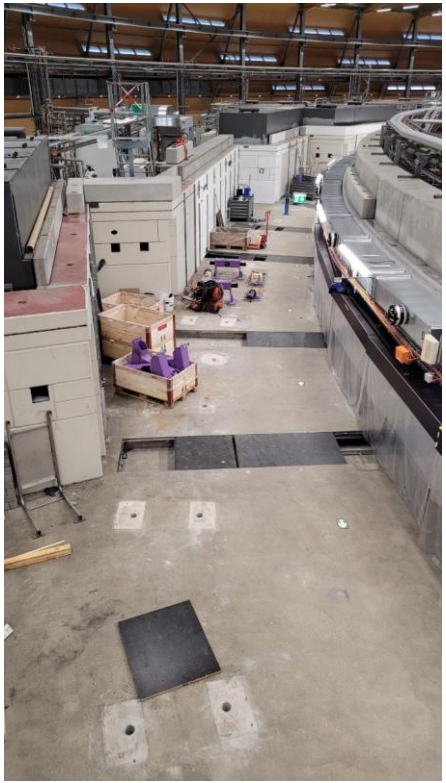
nstitute PSI

SLS 2.0 – Milestones

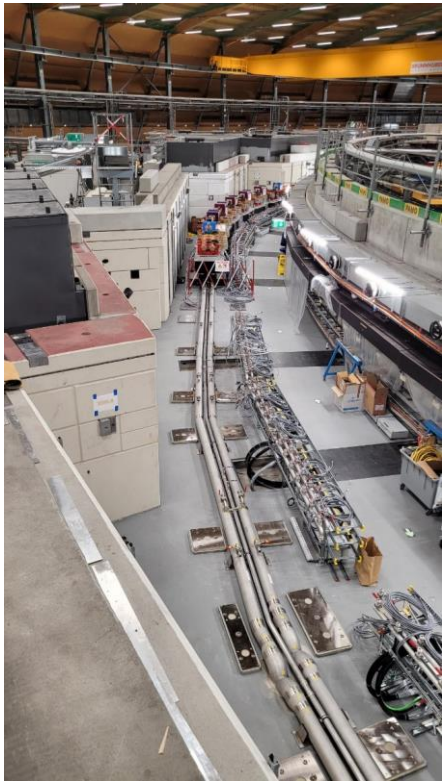




03.10.2023



28.11.2023



07.03.2024

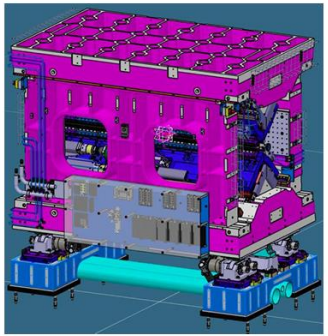
12.08.2024

- Post Darktime Undulator Plans
- **Phase II Shutdown** was planned for 2-3 U17 and one UE38
  - Ended up installing one UE36kn
  - Other undulators delayed due to delivery or technical issues

installed May 2026 2027

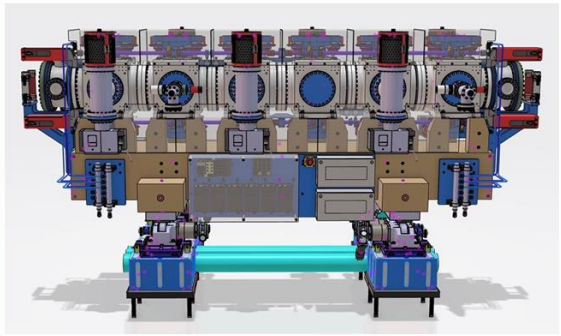
Soft X-ray

- 2x UE36kn (APPLE X knot, 2 m each)
- 1x UE38 (APPLE X, 2 m)
- 1x UE36kn (APPLE III knot, 4 m)
- 1x UE90kn (APPLE III knot, 4 m)



Hard X-ray

- 1x U15 (linear, 2 modules, 1 m)
- 4x U17 (linear, 6 modules, 3 m each)
- 1x HTSU10 (linear, HTS Bulks, 1 m)



installed Aug 2026 - 2028

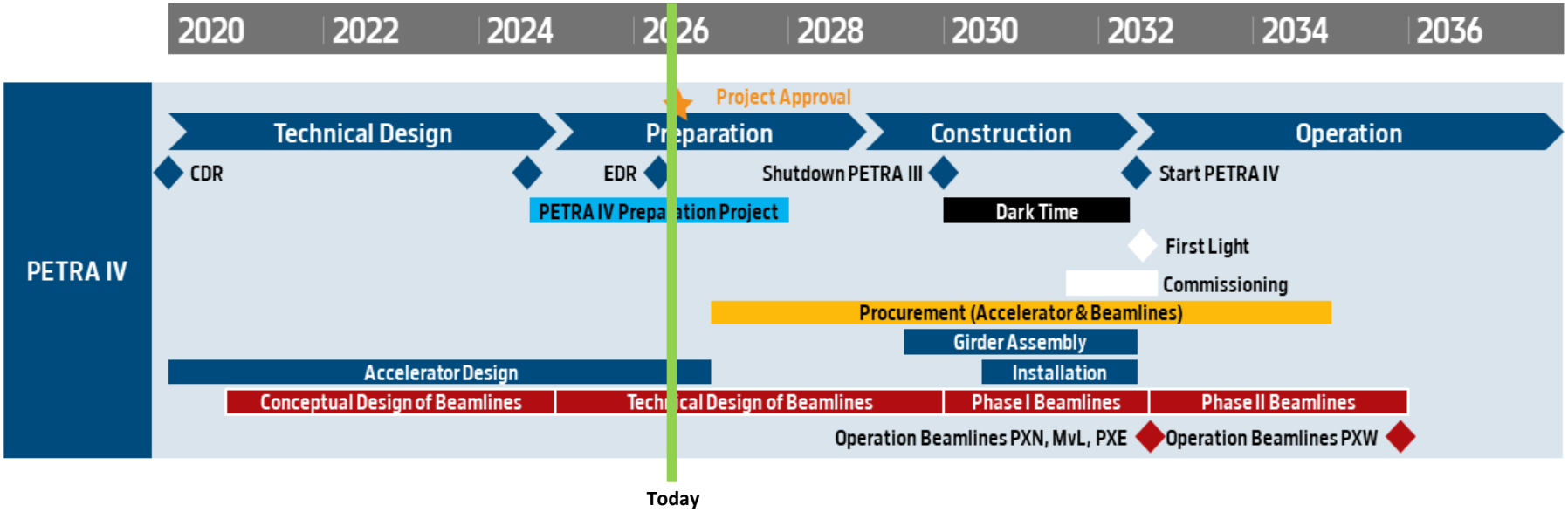
PETRA IV overview

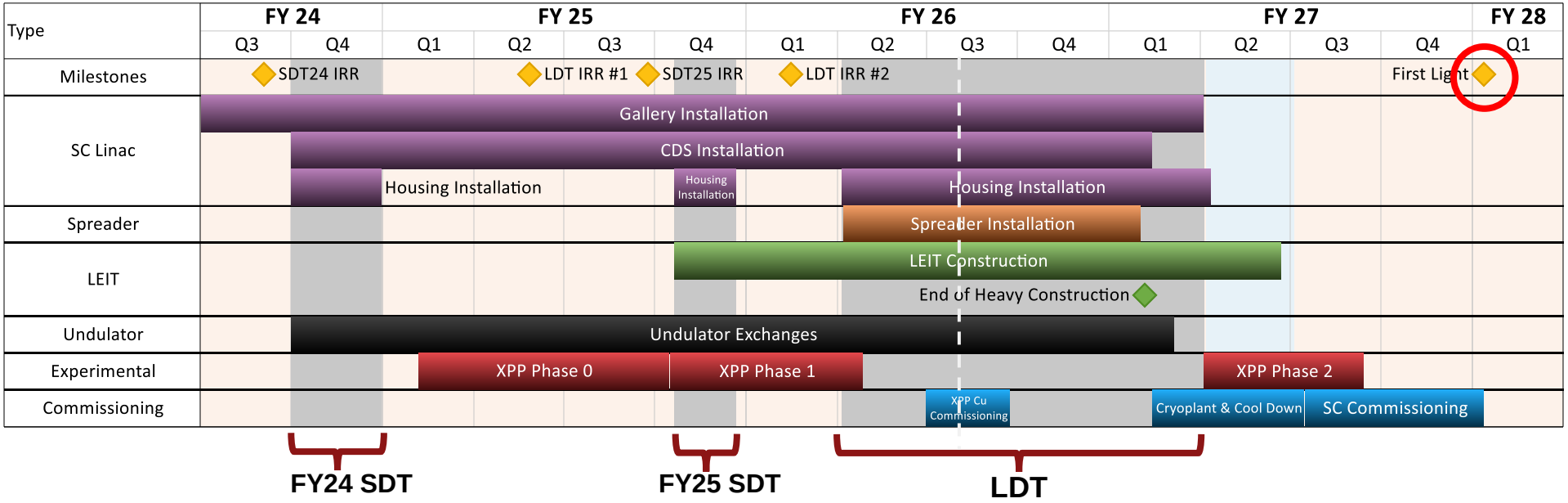
Schedule

Shutdown of max. 2.5 years (2030/2032)

Start of operation 7/2032 with 19 beamlines

Project duration: 9 years (2027-2035)



High Level Installation Schedule: SLAC-LCLS II- HE

- Limited schedule; parallel installation efforts necessary