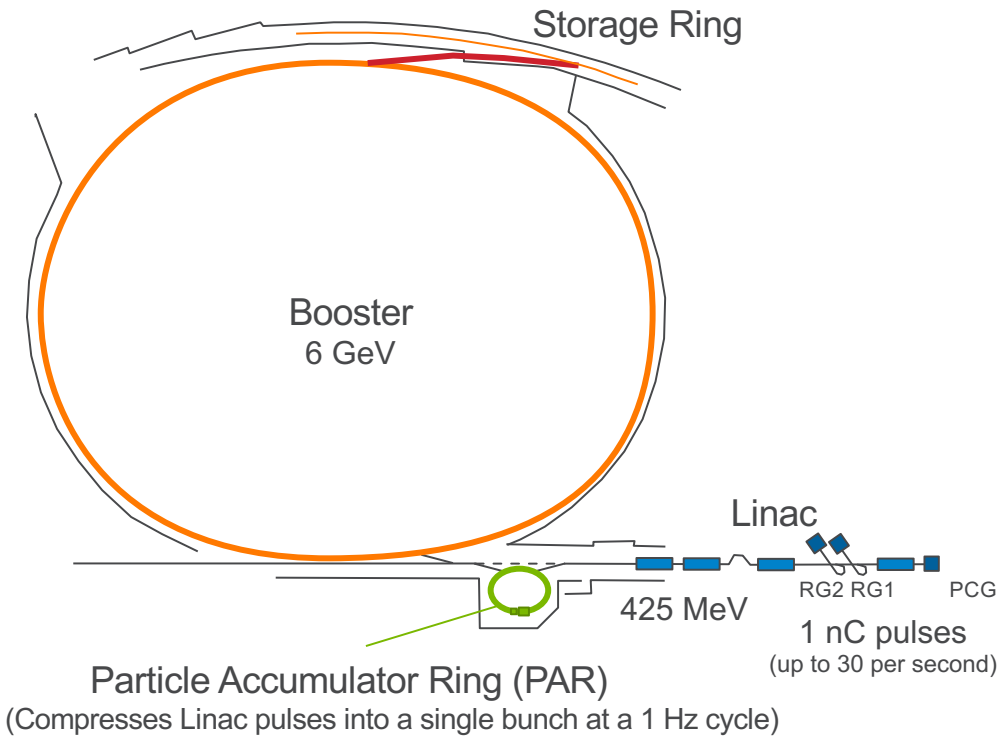
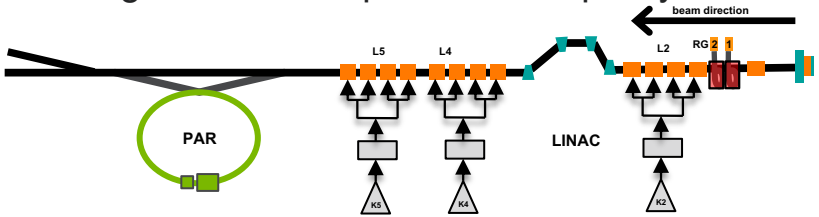
SUCCESS STORY:
LINAC AND PAR RECOMMISSIONING

Ihar Lobach
Assistant Physicist, APS Linac Manager
Accelerator Systems Division

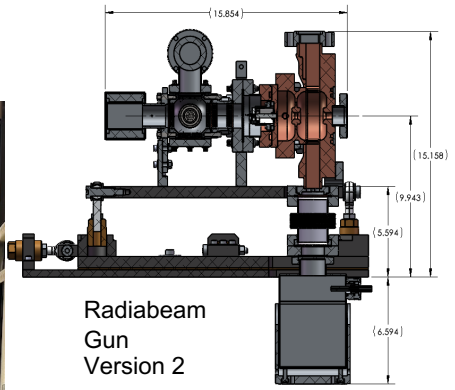


UPGRADES TO THE LINAC

- New timing system
- RF station #2 (50-MW klystron, modulator, digital low-level RF system)
  - Work started for RF station #5, hoping to obtain funding for more stations
- New thermionic RF electron guns
  - RG2 (main)
  - RG1 (backup)
- Ten new, faster magnet power supplies. More to come
- Facelift plates for RG1 alpha magnet to shield the leakage field and improve beam quality



Libera DLLRF at K2



Radiabeam
Gun
Version 2

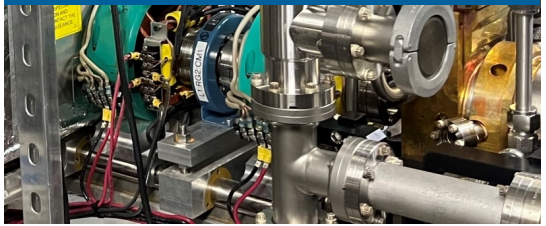
50-MW K2 klystron and modulator

RECOMMISSIONING THE LINAC

RG2 beam: achieved close to pre-shutdown performance; goals for APS-U commissioning are met.

- Up to 100% Linac-to-PAR injection efficiency; 1 nC per pulse.
- A prototype radiabeam gun was used in RG2 for the last two years. A production gun was installed in July. During the start-up, no beam could be captured in the Linac with the production gun. It was removed for investigation and the prototype gun was re-installed.

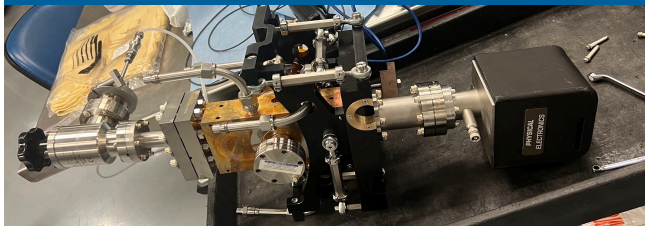
Production gun installed at RG2



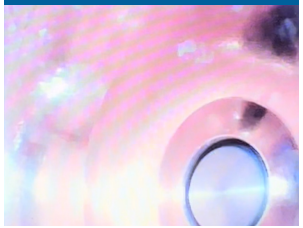
Next steps:

- Optical survey of alignment
- Gun test in the injector test stand

Production gun under investigation in the clean room

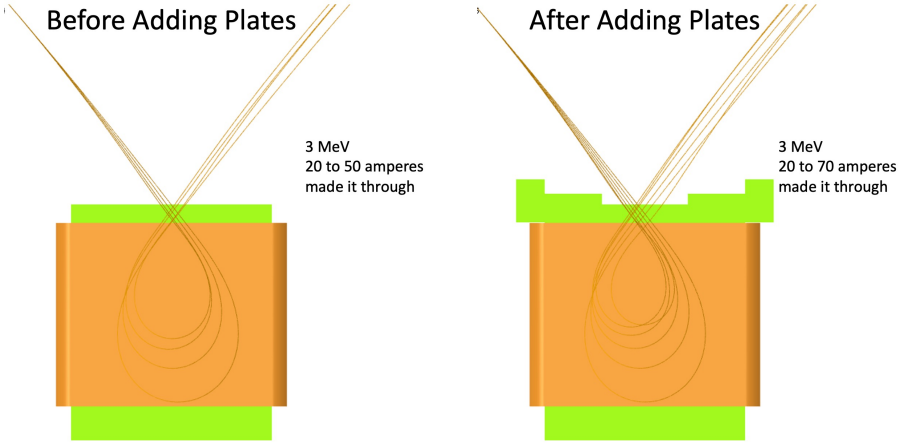


Borescope image of the cathode



RECOMMISSIONING THE LINAC

RG1 beam



- Re-established RG1 beam after installation of the RG1 alpha magnet facelift plates. 50% injection efficiency into PAR.
- Commissioned 9 new fast bipolar power supplies in RG1 beamline
- Huge improvement in optimization speed; opens a path for more AI/ML applications in the Linac

New fast bipolar linac power supply

- Improved RG1 beam stability by replacing the RG1 kicker thyratron

PARTICLE ACCUMULATOR RING (PAR) RECOMMISSIONING

Content provided by K. Harkay, PAR manager

- Good news
  - Demonstrated the Linac/PAR goals for APS-U commissioning: 1-5 nC PAR beam ready for injection into Booster.
- Startup issues
  - Higher than expected vacuum pressure after installation of two new ceramic kicker chambers.
- Next steps
  - Digital low-level radiofrequency (DLLRF) setup for operations is in progress. This improves control of beam capture and compression in PAR.
  - Booster Internal Readiness Review (IRR) is scheduled for December, which will be followed by Booster commissioning with beam.

PAR kicker chamber with innovative Ti coating