Advanced Superconducting Test Accelerator (ASTA): Status and Plans

Mike Church
All Experimenters Meeting
June 24, 2013
Overview of ASTA Facility

Aerial view courtesy T. Nicol

NML interior
Full ASTA Layout

Original NML building

Photoinjector and low energy test beamlines

1 to 6 cryomodules

High energy test beamlines

IOTA storage ring

75 meters

New tunnel extension

Mike Church, All Experimenters Meeting, June 24, 2013
CY13 -- 50 MeV Injector + 1 Cryomodule

- **Goal:** installation complete and beam commissioning started by end of CY13
  - RF gun + RF system and photocathode laser system
  - 2 SCRF booster cavities (“CC1” and “CC2”) + RF systems
  - 50 MeV beamline elements and instrumentation to the low energy dump
  - Low energy beam dump
  - SCRF cryomodule (“CM2”)
- Installation of 1st AARD experiment (high brightness X-ray channeling source)

![Diagram of Beamline Elements and Instrumentation](image_url)

- **50 MeV beam energy**
- **22 meters**
- **ASTA photoinjector**
- **To be installed in CY13**
1.3 GHz Superconducting RF Cavities

CM2 at ASTA

CC2 Installed at ASTA

CC1 ready for refurbishment
RF Gun Systems

Electron gun + cathode transfer

"9-way cross"

Main UV laser table

High power RF
1st Photoelectrons -- 6/20/13

- 8 – 15 bunches @ 3 MHz
- Kinetic Energy ~ 3.3 MeV
- ~ 5 μJ/pulse laser energy
- Produced from Mo cathode (QE ≈ 2E-5)
- 32 MV/m peak gun gradient
- 2 MW klystron power
- Many thanks to all the people who contributed!
Short Term Future Activities

- Continue conditioning the RF gun (goal is 45 MV/m, currently at 32 MV/m)
- Complete installation of CM2
- Install CC1
- Cool down and commission CM2, CC1; recommission CC2
- Continue gun photoelectron studies @ 3 - 5 MeV
- Continue installation of 50 MeV beamline components
- 1st ASTA User’s meeting this Summer (July 23-24)
- Start commissioning 50 MeV injector into beam dump in the Fall