

LCLS Modes of Operation

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The following modes of operating and containing the LCLS beam are described here.

1. No beam, injector in controlled access
 - laser to cathode permissive, but no high-power RF permissive
2. Injector operation with beam to the sector 21 dump in the linac housing
 - 1 nC at 120 Hz maximum
3. Beam to the BSY, stopped in the BSY
 - 1 nC at 120 Hz maximum
4. Beam to the LTU (linac to undulator) single bunch beam dump
 - 1 nC at 120 Hz maximum
5. Beam to the undulator entrance tune-up dump
 - 1 nC at 10 Hz maximum
6. Beam to the final beam dump
 - 1 nC at 120 Hz maximum

Mode 0 is understood to be no beam and no laser or RF permissives.

In mode 1 it will be possible to enter the injector housing under controlled access, and with laser safety requirements satisfied, to enable set up of the laser to the cathode. With the RF off it is sufficient to guarantee that no electrons are transported through the injector.

Mode 2 permits tuning of the injector up to full rate and charge, but with no beam transported through the linac. The inflection bends into the linac are configured that the beam stops at the spectrometer in the linac housing. This requires no access in the linac housing but it may be possible to access the BSY.

Mode 3 allows tuning of the linac up to full rate with beam stopped in the beginning of the BSY. In this mode (and in modes 1 and 2) access beyond the muon shielding in the LTU would be permitted.

The single bunch beam dumper (SBBD) in mode 4 limits the beam rate in the downstream LTU and undulator beamline to:

- No rate
- Single shot
- 1 Hz
- 10 Hz
- 120 Hz

This rate limiting is for MPS only and not intended as a PPS stopper. The single bunch beam dump will be rated for continuous 120 Hz operation as it is foreseen to keep the linac operating at a steady 120 Hz but vary the rate to the undulator by selective dumping of bunches.

In mode 5 the beam is prevented from damaging the undulator during tune up in the LTU by parking the beam on the tune-up dump at the undulator entrance. This tune-up dump is for undulator MPS only and not intended as PPS stopper. The tune-up dump will be rated for 120 Hz operation, but we will choose to limit the beam rate at the stopper to 10 Hz to minimize radiation in the area.

Mode 6 is for full operation of the LCLS with the electron beam to the final dump.

Operating modes for the Near Hall, Far Hall and x-ray beam lines are decoupled from the electron beam operation modes by the x-ray shutter system.

PPS zones and access states to the LCLS are described in a separate document.

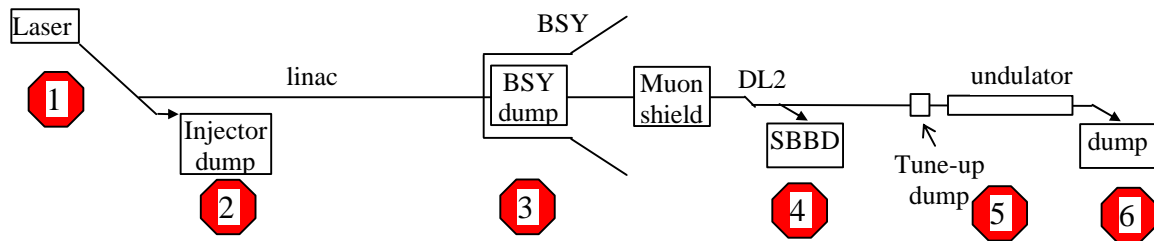


Figure 1: Schematic of LCLS operating modes