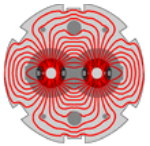


US LHC Accelerator Research Program

BNL - FNAL- LBNL - SLAC

SLAC RC Status Report

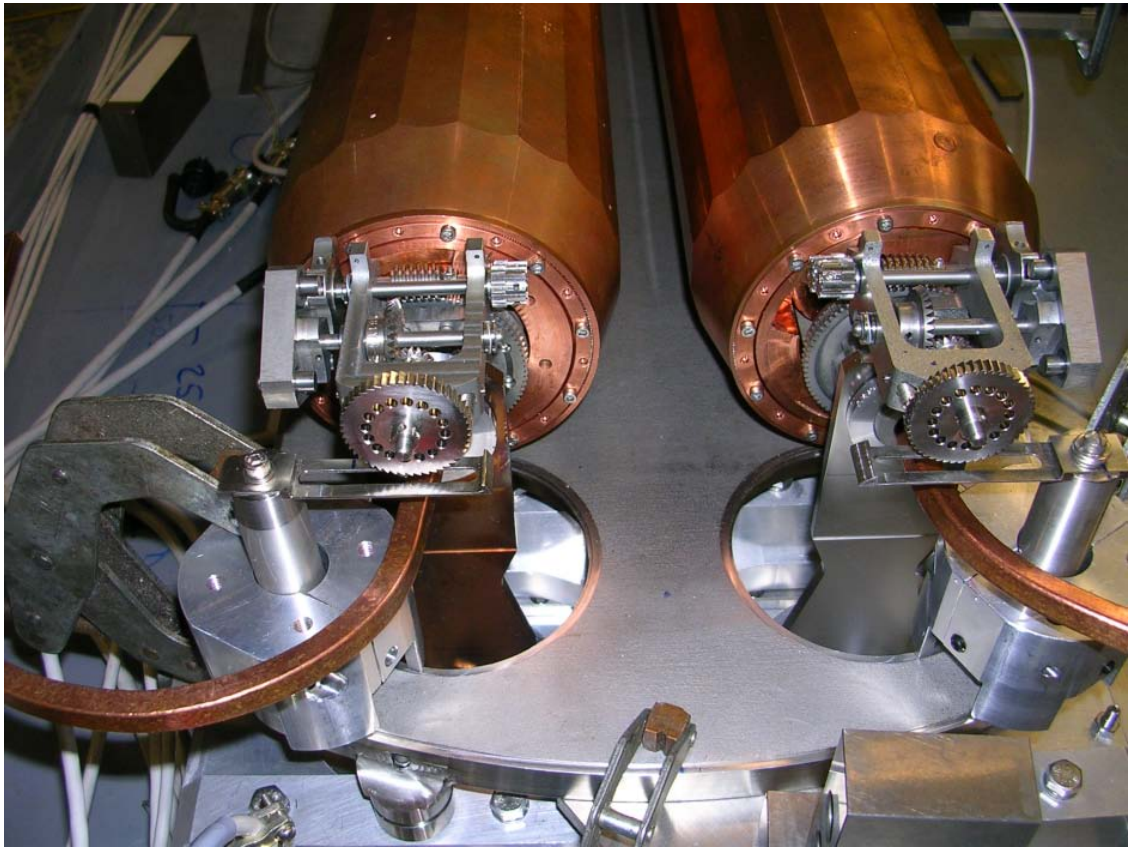
19 July 2010

LHC Collimation Working Group Meeting

Jeff Smith/SLAC

Activities Since 7/5/2010 Status Report

- Even more testing of rotation drives and actuators
- Finished jaw bearing fixes
- Independent method to verify proper facet positioning

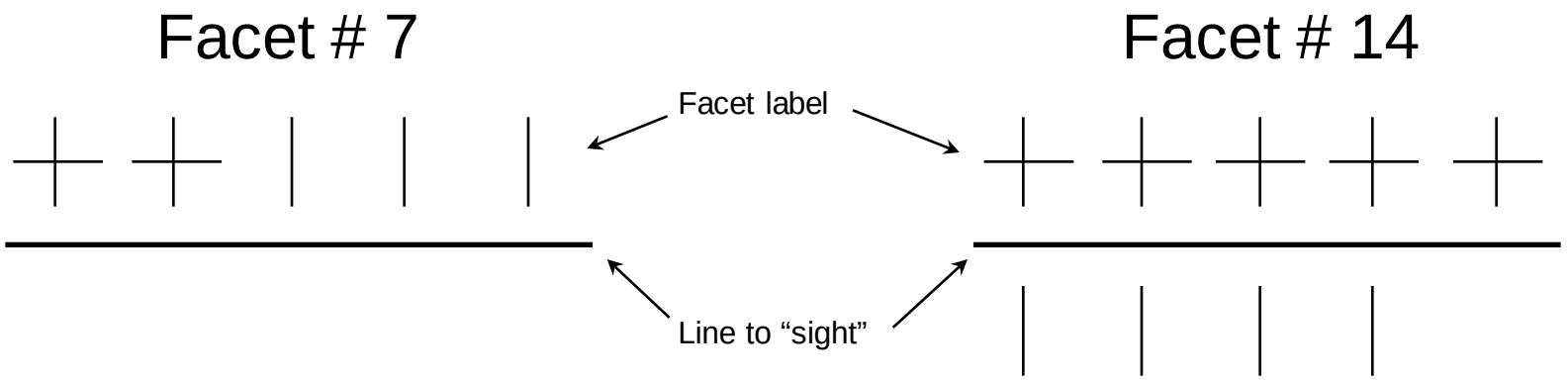


Independently measure angular position of jaws

- Discovering that the rotation mechanism will miss ratchets. The pawl helps but still cannot guarantee no missed ratchets.
  - The Geneva Mechanism helps insulate the jaw from missed ratchets
  - Nevertheless, we want an independent way to directly measure the angular position of the jaw.
  - A solution for a future collimator may be a resolver attached directly to the end of the jaw
  - For this prototype we believe using an optical sight and scribe lines on each facet will work well.
    - Given the angular precision of the jaw (0.154 degrees), a scribe line on the facet must be sighted to within 180 microns -- not a problem. Optical survey equipment can do much better
    - Maybe could set up a camera to image the sight but for now, “by eye” is fine

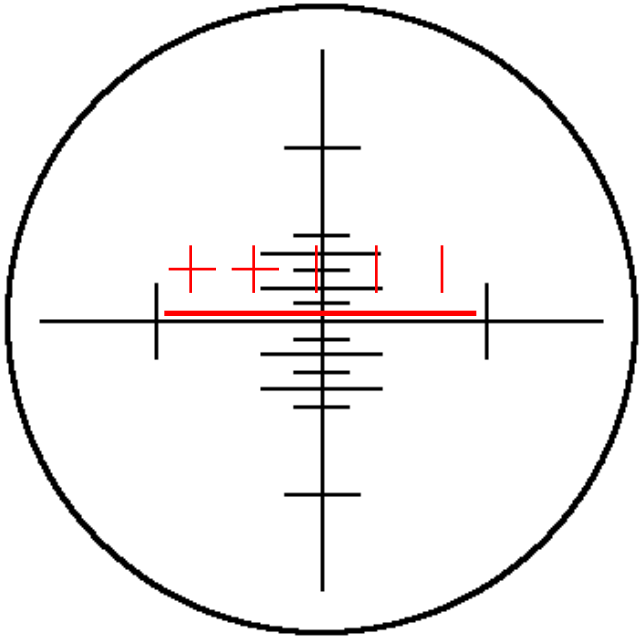
Scribe Lines

- In addition to aligning the jaw, the scribe lines will also allow us to label each jaw
  - We want the position of the jaw to be always obvious by simply looking at it
    - This means don't rely on log books and counting times it was rotated
  - By simply looking at the jaw it will be obvious which facet is facing the beam.

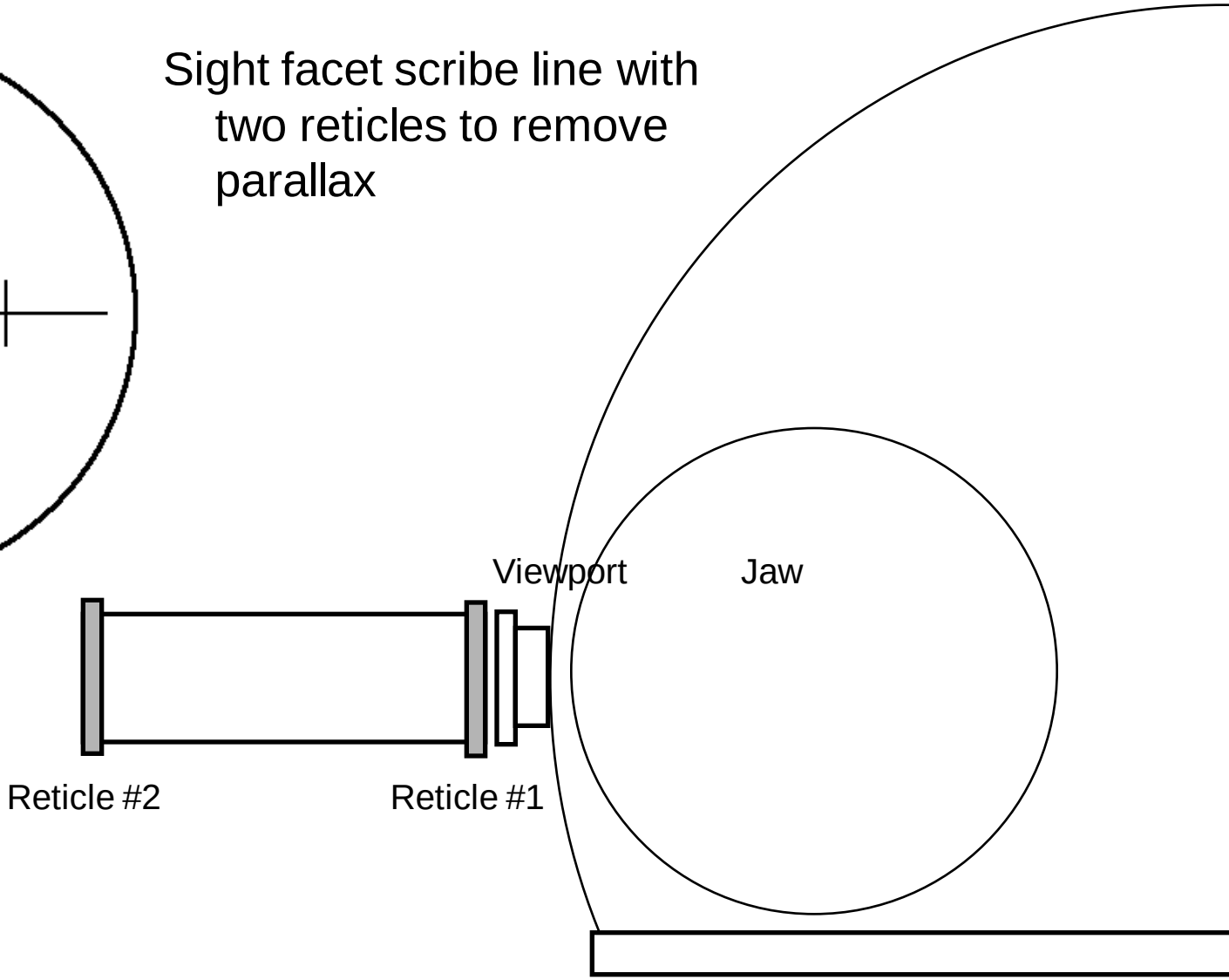


LARP

Sighting scribe lines with scope

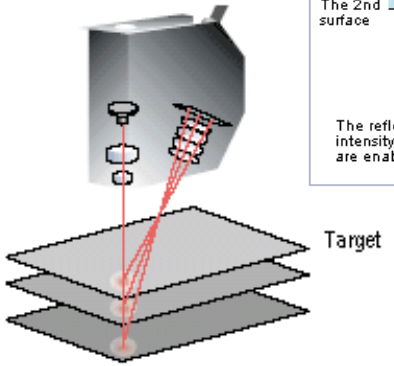


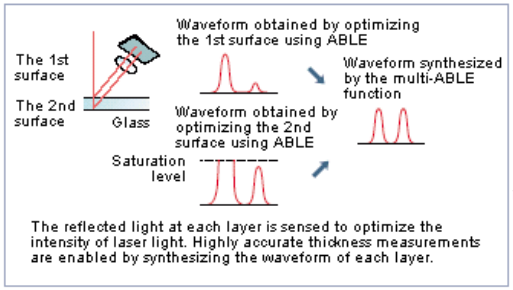
Sight facet scribe line with two reticles to remove parallax



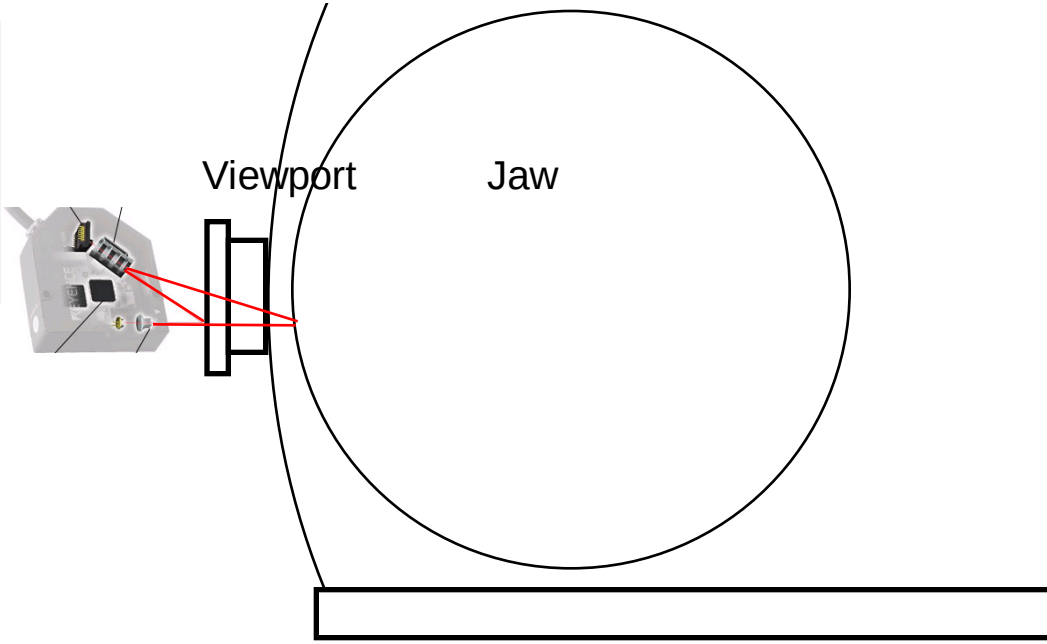
Survey Jaw Position

- Once vacuum chamber is welded shut we need to survey in the jaws relative to the drive table reference points
- Viewport windows can be surveyed in traditionally with the drive table
- Then use laser micrometer to measure the distance between the viewport window and the jaw surface.
  - Should be able to get 5 micron precision on Jaw position





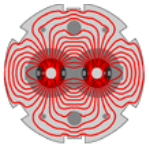
can simultaneously view several transparent surfaces



RC Tasks to Complete

LARP

- Complete rotation drive tests in lab
- Switch out all stainless screws for molybdenum screws
  - Fabricate the final 4 “wavy arcs” for contact resistance & Rhodium plate
  - Fabricate 4 mounting brackets for arcs, thermistors & RF foils
- Fabricate scribe scope and scribe facets
- Final cleaning:
  - Acetone & alcohol for all parts
  - Chemical cleaning of upper vacuum tank vessel
  - Bellows already vacuum fired & leak checked
- In a real clean room
  - Weld bellows to jaw supports & to baseplate
  - Reassemble jaws on baseplate
- Vu tubing now bent down & brazed to feedthroughs
  - Final alignment, survey & test of all parts
- Weld vacuum tank & test rotation drive
- Vacuum bakeout & final test of rotation drive
- Immobilize, protect, install shock monitors and do paperwork for shipping



Reference Material Follows

SLAC design details