LIGO II IO/PSL Optical Table Layouts

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Goals

- **Coordinate and optimize the integrated IO and PSL layouts before designs are "frozen"**

- **Reduce complexity of IO/PSL optical table layout**
    - Minimize the number of mirror mounts
    - Make optical paths as short as possible

- **Simplify the optical interface between the IO and PSL subsystems**
    - Reduce the number of optical components required to satisfy interface requirements
    - Provide a stable interface that minimizes coupling of PSL beam changes to IO system

LIGO I PSL Optical Layout

IO/PSL Optical Table Layouts
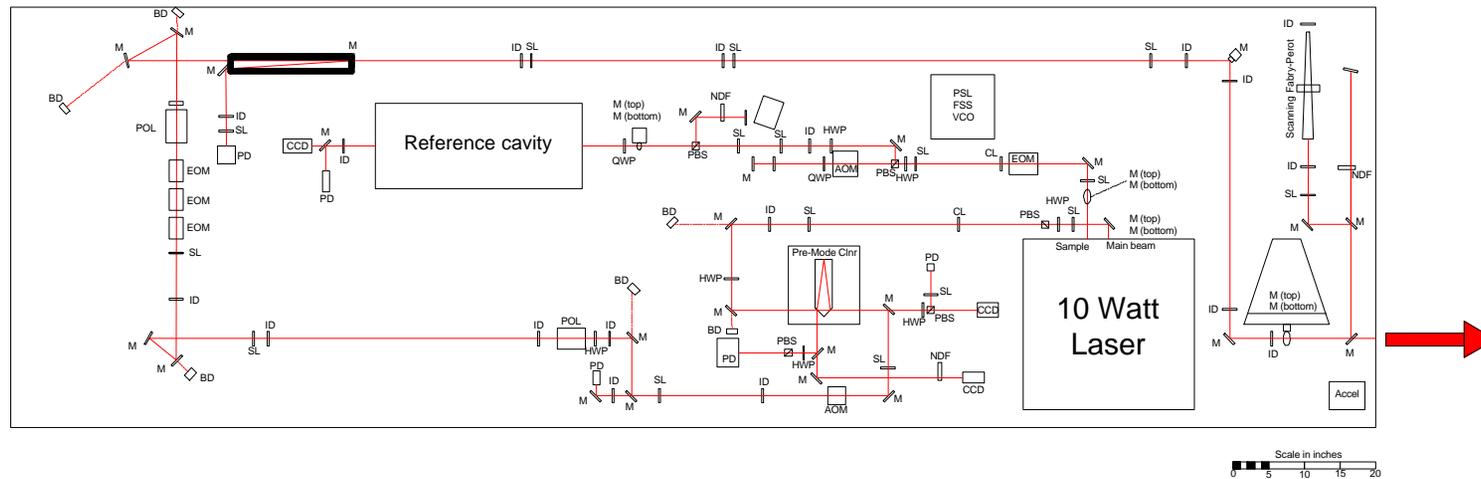
Strategy ...

- **Position major optical components such that optical path is simplified and length is minimized**

- **Minimize number of mirror mounts**
  - » Two adjustable mounts for alignment into optical cavities
    - – Pre-modecleaner
    - – Reference Cavity
  - » One or two adjustable mounts to align into IO optical train
  - » One adjustable mount to align into PSL frequency shifter AOM
  - » One adjustable mount for retroreflection through AOM
  - » Two PZT-controlled mounts for alignment into modecleaner
    - – Both on the IO periscope to simplify laout
  - » Fixed mounts where only "folding space" is required
  - » Fixed mounts in all periscopes

… Strategy

» All EOMs on adjustable mounts

» All lenses positioned then locked in place

- IO/PSL Optical Interface

  » Midpoint between flat mirrors in pre-modecleaner

    – Provides a stable, fixed location for interface

    – Isolates changes in PSL beam changes from IO

    – Leaves all modematching downstream of the PMC in the scope of the IO system

Possible Optimized Layout