

CHARA TECHNICAL REPORT

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OPLE Optical Table Requirements

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1. INTRODUCTION AND GENERAL INFORMATION

The CHARA Array will employ five 1-m size, alt-azimuth style telescopes at a site on Mount Wilson in southern California. The telescopes will be housed separately and operated remotely from a central laboratory. Light from each telescope will be directed by subsequent flat mirrors through vacuum pipes to additional optics and instrumentation at the central laboratory.

Many optical mounting surfaces will be required inside the central laboratory, both at the ends of the optical path length equalizer (OPLE) and inside the beam combining laboratory (BCL) itself. Since the tables at the ends of the OPLE area will be difficult to install once the OPLE support system is put in place, it is necessary to have them installed before the support system is built.

This document sets out the requirements for these tables. The quotations will be broken into five parts:

1. Site testing.
2. The tables themselves.
3. The table supports.
4. Delivery.
5. Installation.

Vendors must bid on all of these parts.

2. SITE TESTING

The inertial slab within the OPLE building is to be tested for vibration background before the tables are delivered. The tests results will be in the form of a vibration power spectrum measurement including frequencies up to 150 Hz. The OPLE/BCL building is next to the

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Hooker 100" telescope dome and the vibrations created by moving this dome are also to be measured. A power spectrum measurement will also be made with the dome in motion.

The table specifications will then be re-examined to ensure that they are adequate and if necessary a change of order will be made.

3. TABLE SPECIFICATIONS

Four tables and rigid table supports are required. The basic specifications for the tables are set out in Table 1. Due to anticipated problems with differential expansion the top and bottom surfaces must both be made out of the same material.

TABLE 1. Table Specification.

Quantity	4
Table Size	12' × 4' × 12"
Hole Pattern	$\frac{1}{4}$ - 20 Threads in 1" square pattern to reach within 1.5" from table edge. Must have corrosion-proof sealed holes
Compliance at first resonance	1.5×10^{-5} in/lb
First resonance	> 100Hz
Maximum Dynamic Deflection Coefficient	2×10^{-3}
Maximum Relative Motion Value	8×10^{-9} in
Deflection Under 250 lb Load	8×10^{-5} in

4. TABLE SUPPORTS

The tables are to be mounted on non-isolation steel legs on a concrete inertial slab in a temperature controlled environment. The table height is not accurately known at this time but the top of the tables will be approximately 38 inches from the floor. The legs will allow an adjustment of the table height of at least ± 1 inch.

The area in which the tables are to be located contains many other optical instruments, including vacuum light pipes. The table support system must be constructed such that it does not interfere with these systems. Figure 1 contains a diagram of the inertial block already in place that is to be used to mount the tables, including the allowable locations for the table supports.

5. DELIVERY AND INSTALLATION

The tables are to be delivered to CHARA's facility at the Mount Wilson Observatory, Mount Wilson, CA, 91023. The OPLE/BCL building is now under construction and is due to be completed by February 1997. The tables must be delivered and installed in the building no

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later than 15 March 1997. The vendor will need to coordinate the delivery and installation of the tables with GSU.

6. OTHER REQUIREMENTS

- All vibration isolation tables must have a lifetime warranty against defects in material and workmanship. The laminated table top must have an extended lifetime warranty against delamination under normal use.
- We reserve the right to instrumentally inspect the delivered and installed tables and have a spectral analysis performed, and to return the table and mounts at the vendor's expense if they do not meet the specifications.
- The table must be fine tune damped to our specific requirements. We reserve the right to be present at the factory during the tuning of the table to insure that the table meets our requirements after tuning.
- The dampers should be hermetically sealed hydraulic dampers which target specific frequencies. Dampers constructed of steel layers glued together or broadband damping only are not acceptable.
- GSU reserves the right to be present and witness the testing of the tables at the vendor's location.

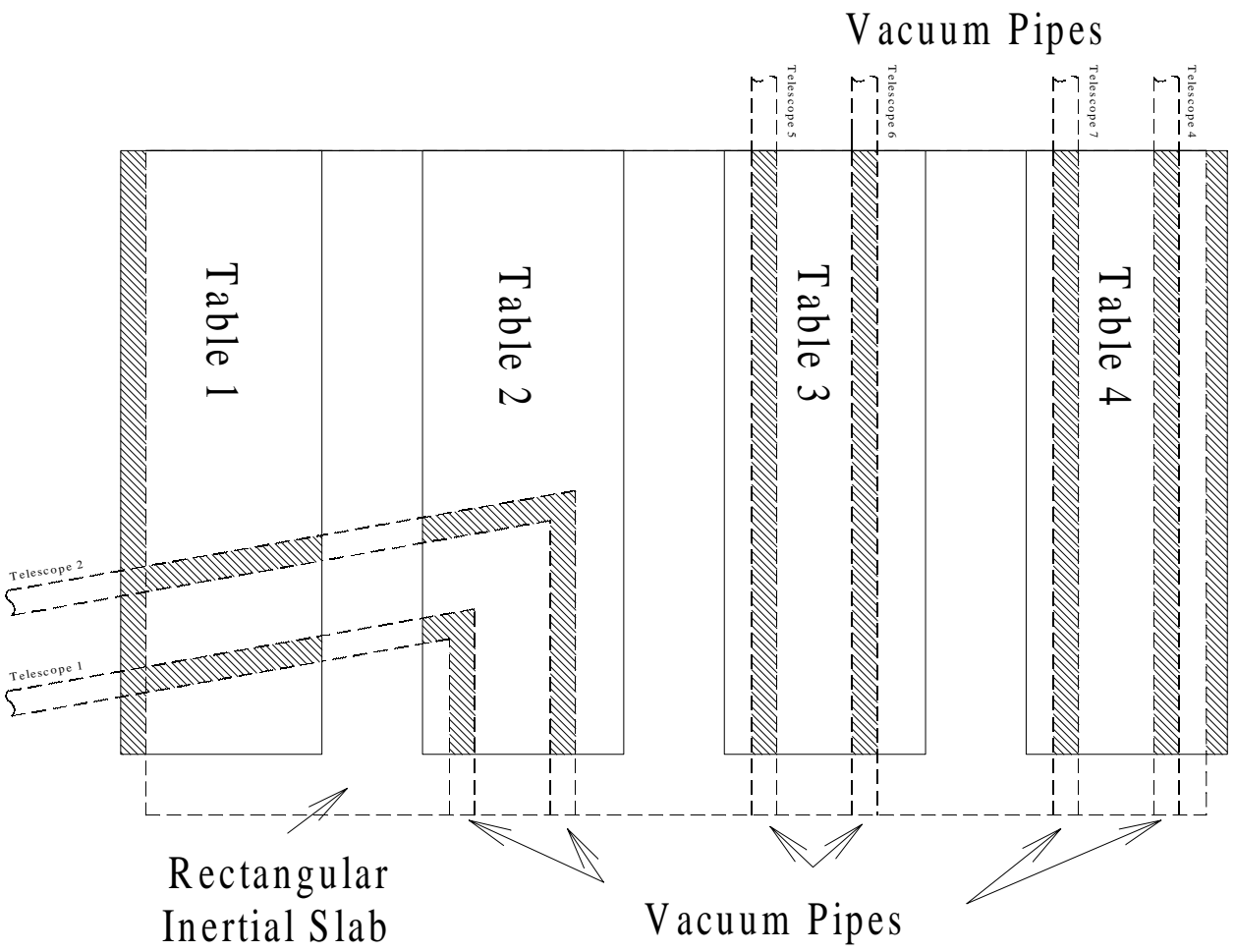


FIGURE 1. A 48:1 scale drawing of the inertial slab and tables. The positions of the vacuum pipes and other areas where supports legs cannot be placed are marked with dashed lines.