CHARA Technical Report

No. 43 15 July 1997

BCL 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. More information about the CHARA Array can be found at our WWW home page listed below.

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.

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

1. The tables themselves.
2. The table supports.
3. Delivery.
4. Installation and Testing.

Vendors must bid on all of these parts and supply a separate costing for each part.

2. TABLE SPECIFICATIONS

Four tables, each with rigid table supports, are required. The basic specifications for the tables are set out in Table 1. These specifications are based on vibration tests performed on the the site. An example of the measurements is shown in Figure 1 and a full technical report (TR42) containing a description of the measurements can be found on our web page listed below. A hard copy of the report is also available on request.

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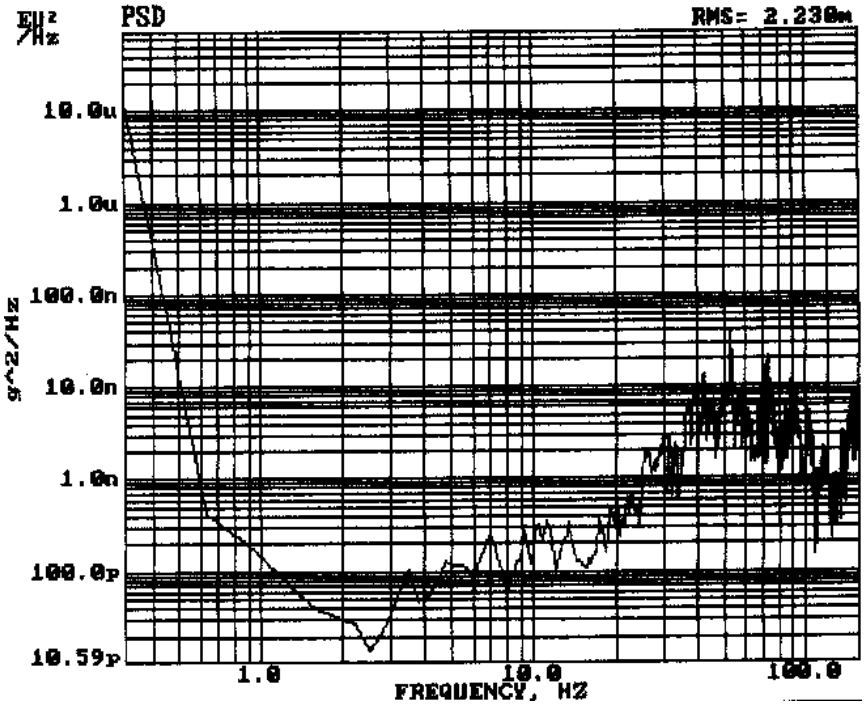

FIGURE 1. Typical vibration spectrum measurement for site.

Due to anticipated problems with differential expansion the top and bottom surfaces must both be made out of the same material. Furthermore, the top surface must be made of a single piece of material. A top surface consisting of two separate pieces will not be acceptable.

3. TABLE SUPPORTS

The tables are to be mounted on non-isolation steel legs on a concrete inertial slab in a temperature controlled environment. The top of the tables will be 40 inches from the floor. The legs will allow an adjustment of the table height of at least ± 1 inch.

Figure 2 contains a diagram of the inertial block already in place on which the tables will be placed, including the current optical layout to be placed on the tables. This slab is inside the inner enclosure of the BCL/OPLE building. For more detailed information about the placement of the tables within the BCL, contact Dr. Theo ten Brummelaar at (404) 651-1882.

4. DELIVERY AND INSTALLATION

The tables are to be delivered to CHARA's facility at the Mount Wilson Observatory, Mount Wilson, CA, 91023. The tables must be delivered and installed in the building no later than 1 March 1998. The vendor will need to coordinate the delivery and installation of the tables with CHARA's Site Manager, Mr. Bob Cadman. His telephone number is being

TABLE 1. Table Specification.

Table 1	$4' \times 8' \times 18''$
Table 2	$5' \times 10' \times 18''$
Table 3	$5' \times 8' \times 18''$
Table 4	$6' \times 8' \times 18''$
Hole Pattern	$\frac{1}{4} - 20$ threads in $1''$ square pattern to reach within $1.5''$ from table edge. Must have corrosion-proof individually sealed holes.
Compliance at first resonance	$< 1.4 \times 10^{-5}$ in/lb
Maximum amplification at lowest resonance	< 2
Lowest resonance	> 150Hz
Maximum Dynamic Deflection Coefficient	$< 1.4 \times 10^{-3}$
Maximum Relative Motion Value	$< 10 \times 10^{-9}$ in
Deflection Under 250 lb Load	$< 8 \times 10^{-5}$ in

changed at this writing. Contact Sandy Land at (404) 651-2932 for Mr. Cadman's current number. Access to the site for the purpose of installation cost estimates can be arranged on request.

5. 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 or an equivalent system. If an equivalent is to be used, documentary evidence of the functionality of the system is to be provided to GSU. Both broadband and tuned damping will be required.
- GSU reserves the right to be present and witness the testing of the tables at the vendor's location.

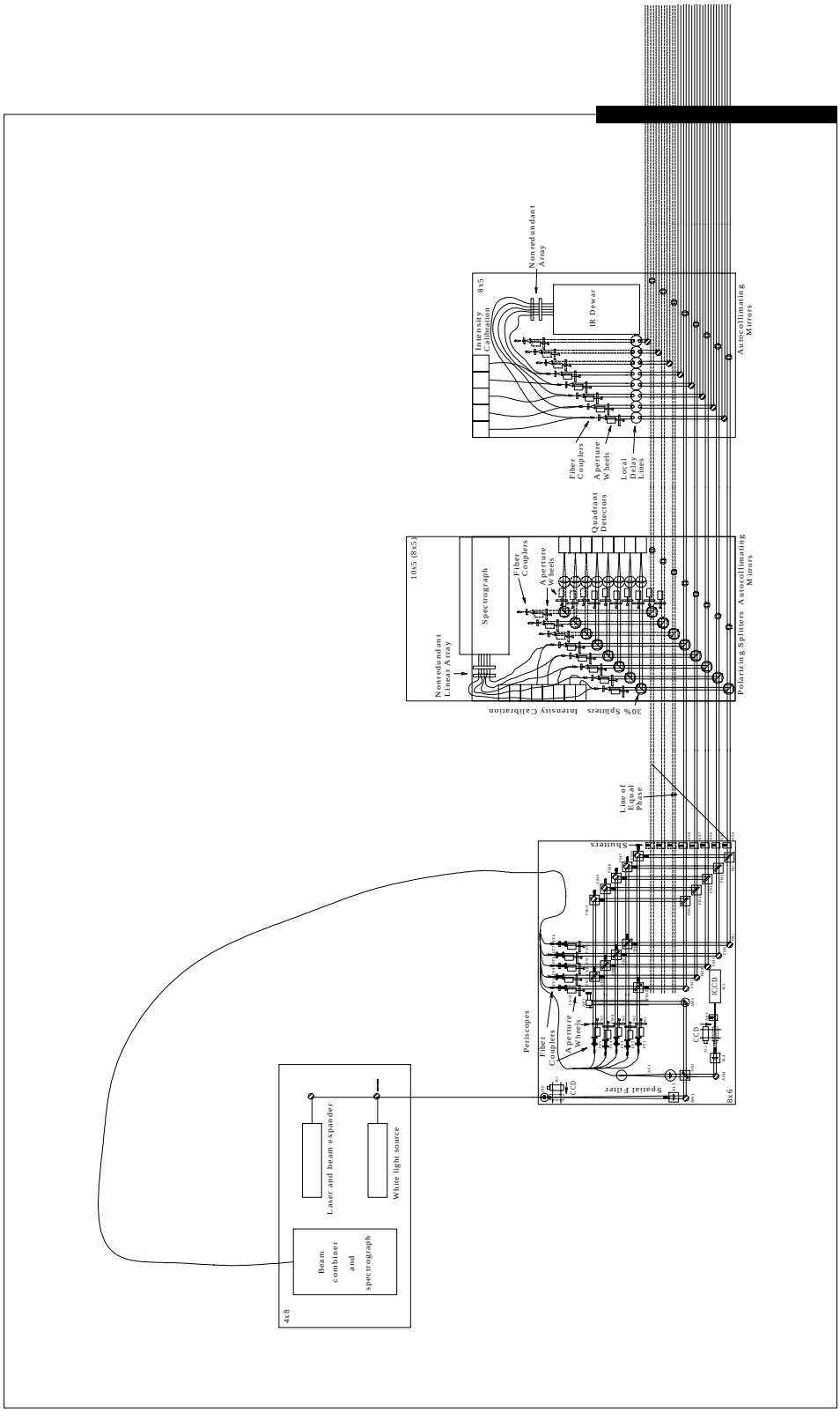

FIGURE 2. A 1:64 scale drawing of the BCL inertial slab and tables. The solid line at the top right shows the connection to the OPLE area