D2-250 Heterodyne Module

Model No. D2-250

Document Revision: 1

Document Last Updated on 2016/05/12 15:08

Please read Limited Warranty and General Warnings and Cautions prior to operating the D2-250.

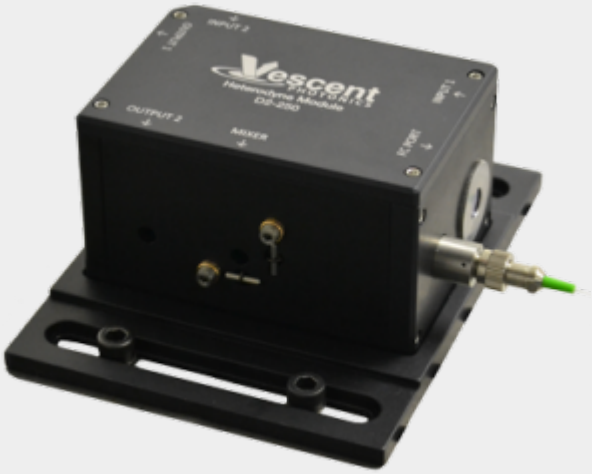

Fig. 1: D2-250 Heterodyne Module

Description

The D2-250 heterodyne module is designed to provide a fiber-coupled heterodyne optical beat note formed by picking-off a small proportion of light from each of two laser beams. Light is coupled into a multi-mode fiber. A second output port can be used to align the overlap the two picked-off beams. The light entering the module should be linearly polarized in either vertical or horizontal direction for best results.

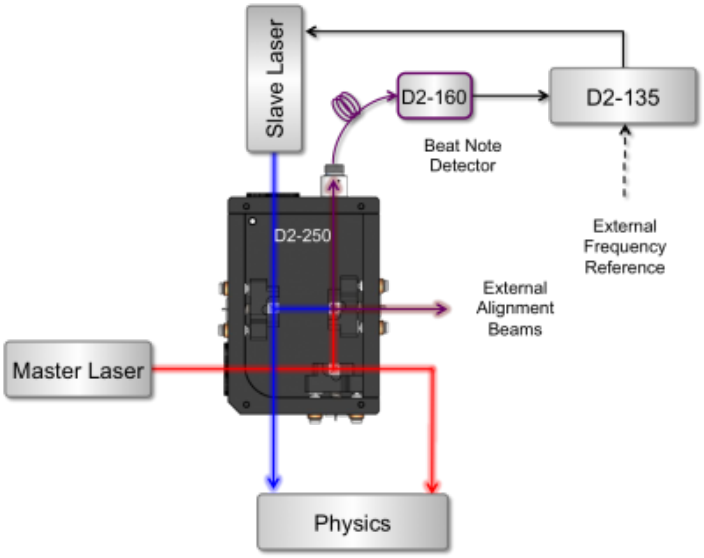

Fig. 2: D2-250 in phase lock system

Purchase Includes

- D2-250 Heterodyne Module
- VPN00460 Fiber Optic Cable (multimode)
- F220FC-B Fiber Coupler

- 5/64“ Hex Key

Absolute Maximum Ratings

Note: All modules designed to be operated in laboratory environment

Parameter	Rating
Environmental Temperature	>15°C and <30°C
Environmental Humidity	<60%
Environmental Dew Points	<15°C

Specifications

	Value	Units
In-coupling	Free-space	%
Wavelength Range	700 - 1,000	nm
Input Power Range	0.1 - 200	mW
Pick-off Percentage	1 - 98	%
Transmission	up to 98	%
Input Polarization	Linear	Horizontal or Vertical
Minimum Power in Beat Note	>50 µW, optimally 200 µW	for use with D2-160
Maximum Power at Detector[1)]	<1	mW
Fiber Connector	FC	
Compatible Fiber Type	MM, PM	

Components

The D2-250 Heterodyne Module utilizes the same three pickoff-cube architecture as the D2-150. With this revision, each input beam passes through a rotatable zero-order half-waveplate prior to a polarizing beam splitter, enabling the user to adjust the amount of power from each source beam diverted to the optically mixed outputs. A 50:50 non-polarizing beam splitter overlaps the pickoff light into a fiber coupler. Each cube rests on a 2-axis kinematic mount adjustable from the module exterior, enabling horizontal and vertical beam pointing adjustment.

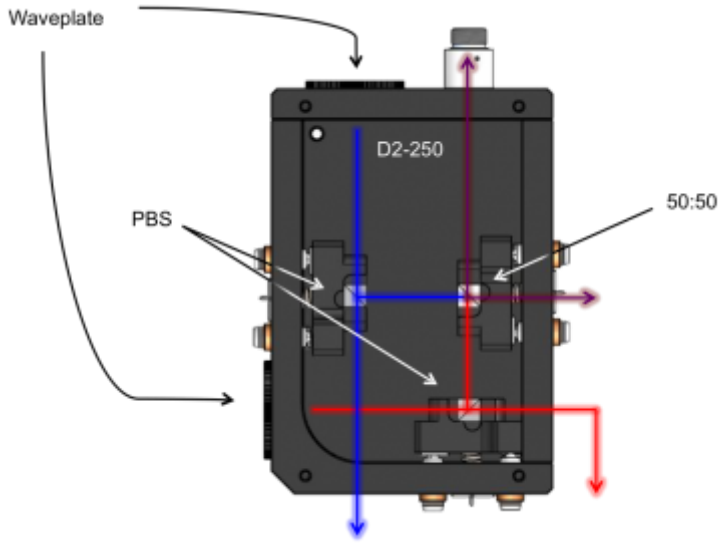

Fig. 3: D2-250 Key Components

Alignment Procedure

The D2-250 Heterodyne Module provides for any two lasers capable of being phase locked to be spatially overlapped and directed into a fiber. This procedure does not assume any specific incoming lasers, with the only restrictions (average power, wavelength) as indicated in the specifications above.

Required Equipment

- (2x) Input laser
- (1x) D2-250 Heterodyne Module
- (1x) VPN00460 Fiber Optic Cable with A/R Coating (included)
- (1x) F220FC-B Fiber Coupler for Heterodyne Module (included)
- (1x) Hex key, 5/64” (included)
- (1x) Power Meter

Procedure

Mount both laser modules and the D2-250 Heterodyne Module to an optical breadboard or table. Leave sufficient space between the lasers and optical modules to allow for the adjustment of the hex screws and insertion of the F220FC-B Fiber Coupler and VPN00460 Fiber Optic Cable. Turn on both lasers. During mounting, align the first laser such that the beam enters “INPUT1” and exits “OUTPUT1” centered through each aperture. Repeat with the second laser through “INPUT2” and “OUTPUT2”.

Fig. 4: D2-250 and Laser Mounting

Turn OFF both lasers, then screw the F220FC-B Fiber Coupler into the “FC Port” on the D2-250 and hand tighten. Screw in the FC/APC connector of the VPN00460 Fiber Optic Cable into the F220FC-B Fiber Coupler and hand tighten.

With the power meter, observe the output power through the VPN00460 Fiber Optic Cable. With the 5/64“ hex key, adjust the first kinematic mount in the “INPUT1” beam path (Stage 1) to optimize the optical power observed (and thus the fiber coupling). Using a note card or IR card to observe the “MIXER” output very near to the D2-250, adjust the first kinematic mount in the “INPUT2” beam path (Stage 2) and overlap the observed beams. In the far field, adjust the “MIXER” kinematic mount (Stage 3) until both beams overlap. Some iteration may be required between the second beam and the final kinematic mount.

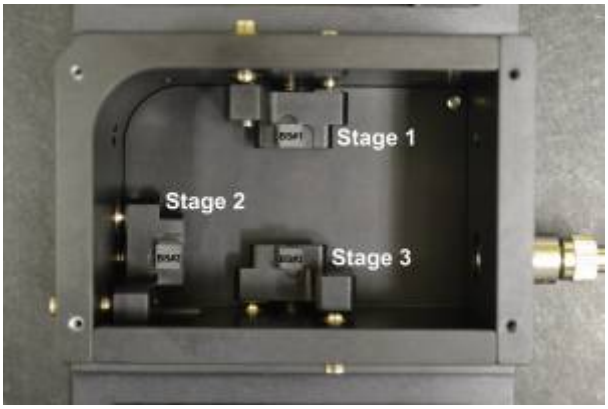

Fig. 5: D2-250 Interior

Fully optimize the coupling into the fiber by adjusting the “INPUT2” kinematic mount and the “MIXER” kinematic mount to optimize the power observed on the power meter.

Block laser #1, and rotate the “INPUT2” waveplate to reduce the observed power below 0.50mW. Block laser #2, and rotate the “INPUT1” waveplate to reduce the observed power below 0.50mW. To protect the D2-160 Beat Note module, the combined power should not exceed 1mW. The SC fiber end can now be connected to the D2-160 or other beat note detector.

1)

In the optical beat note. Since the beat note is delivered through a multi-mode fiber for ease of alignment, the power at the detector is not necessarily the same as the power in the beat note. Damage may occur to the optical element if >1 mW of overall optical power is delivered to the detector.