

**Subject:** Quote for Beamsplitter  
**From:** David Marcus <optics@CustomScientific.com>  
**Date:** Mon, 05 Mar 2007 18:21:59 -0700  
**To:** "Nicholas Law" <nlaw@astro.caltech.edu>

Dear Dr. Law,

Thank you for contacting us about your need for a precision beamsplitter.

Our emphasis and sincere commitment is in the area of providing research-level astronomers with excellent optics, mirrors, filters, and coatings. We are world-renown for our dedication to astronomers. Scientists and engineers on six continents have been relying on our expertise in optical system and telescope instrumentation since 1990.

The optical coatings introduce stress into the substrate which degrades the flatness. Therefore, I have quoted two options. Option 1 uses a lower-cost coating which has higher stress; Option 2 uses a very good coating which introduces much less stress, but it is more costly. The Option 1 configuration is pretty good and I think would be suitable for most imaging applications. Option 2 would be a better choice if you have lasers in your system and are concerned about even small degradations to the laser wavefront, or if you know the system's error budget and that you really do need the  $\lambda/4$  (across clear aperture).

I have expressed the Option 1 ( $2 \times \lambda$ ) as  $\lambda/4$  per inch or  $\lambda/2$  per inch to indicate that the surface error is smoothly varying.

I have also included a description of our professional, portable Cleaning Kit for coated and uncoated optics.

Please contact me if you have any questions about this quotation.

Yours truly,  
David Marcus, Ph.D.  
President

\*\*\*\*\*

Custom Scientific  
3852 North 15th Avenue  
Phoenix, Arizona 85015

Phone: 602-200-9200  
Fax: 602-200-9206  
E-mail: [optics@CustomScientific.com](mailto:optics@CustomScientific.com)  
<http://www.CustomScientific.com>

Quotation #7501  
March 5, 2007  
This quotation is valid for 45 days.

To:  
Dr. Nicholas Law  
Caltech

| Summary of Prices |                                    |                   |
|-------------------|------------------------------------|-------------------|
| Item #            | Description                        | Price Each (\$US) |
| 1.                | Beamsplitter, $2\lambda$ flatness  | 3100              |
| 2.                | Beamsplitter, $\lambda/4$ flatness | 5265              |
| 3.                | Optics Cleaning Kit                | 99                |

Delivery: 7-9 weeks after receipt of order.

Payment Terms: Net 30 days.

Common Specifications

- a. Substrate material: fused silica.
- b. Size: 4.000 +0 -0.020 inches dia. (round).
- c. Minimum Clear Aperture: 3.800 inches dia.
- d. Thickness: 10.0 +0 -1.0 mm.
- e. Coating on Surface 1: R=T=50%  $\pm$  10% absolute 500-950 nm at 15 degrees angle of incidence. R/T may be 40/60 to 60/40.
- f. Coating on Surface 2: Anti-reflection coating, R $\leq$ 1.0% 500-950 nm at 15 degrees angle of incidence.
- g. Documentation: Transmission spectrum and interferograms.

Detail specifications for 2 x lambda flatness

- h. Surface flatness of Side 1 and transmitted wavefront accuracy before coating: lambda/4 per inch or better.
- i. Surface flatness of Side 1 and transmitted wavefront accuracy after coating: lambda/2 per inch or better.
- j. 60-40 scratch-dig.

Detail specifications for lambda/4 flatness

- k. Surface flatness of Side 1 and transmitted wavefront accuracy before coating: lambda/10 or better across clear aperture (3.8" dia.), which is equivalent to lambda/40 per inch.
- l. Surface flatness of Side 1 and transmitted wavefront accuracy after coating: lambda/4 or better across clear aperture (3.8" dia.), which is equivalent to lambda/16 per inch.
- m. 40-20 scratch-dig.

Portable Cleaning Kit for Coated and Uncoated Optics

<http://www.customscientific.com/clean.htm>

- \* Effective, yet gentle solvent appropriate for cleaning most optical coatings, including soft, fragile ones.
- \* Safe, soft wipes for cleaning delicate and robust optical coatings.
- \* Disposable, latex gloves.
- \* Disposable, latex finger cots.
- \* A unique tool for the proper removal of grit.
- \* A hands-free solvent dispenser.
- \* Lens tissue to properly wrap cleaned, coated optics.
- \* Hermetic sealing zip bags for safe storage of delicate optics.
- \* Eight pages of detailed printed instructions.
- \* Enough consumable materials to clean more than 25 filters of 2x2 inch size.
- \* All conveniently packed in a portable, heavy-duty, high-density polyethylene, double-wall, carrying case.

We thank you for your inquiry. Please contact me if I can help you in any way.

Yours truly,  
David Marcus, Ph.D.  
President

Custom Scientific, Inc., 3852 North 15th Avenue, Phoenix, Arizona 85015 USA

Telephone: 602-200-9200, Fax: 602-200-9206, [www.CustomScientific.com](http://www.CustomScientific.com)

Serving engineers and scientists on 6 continents with precision optics, filters, and coatings since 1990.