

## **Application Note**

### **Model LD 8900 Goniometric Radiometer and Customer-Built Goniometer Data Comparison**

The attached plot (next page) illustrate results obtained by two instruments for the same diode operating under the same conditions. The first instrument was a goniometer designed and built by our customer for their in-house testing, which they believe is very accurate. The second instrument was the Model LD 8900 Goniometric Radiometer from Photon.

#### **Instrument Differences:**

1. Photon LD 8900 Goniometer; scan aperture 0.7E circular, radius of scan 85mm; data sampled every 0.05E.
2. Major laser diode manufacturer data gathered on internally built goniometer; scan aperture 1E by 4E, scan radius 75mm; data sampled every 1E.

#### **Discussion:**

The data with the oscillations is that from the Photon LD 8900 with a 0.7E aperture and is real. The customer built goniometer 4E×1E aperture presents data integrated along the 4E collection width and is thus smoother; it is also smoother because fewer samples are taken along the scan. However, data agreement is remarkably similar.

Oscillation variation at the peak will definitely alter reported angular width numbers and thus we'd recommend using a running average value sufficiently large to reduce peak variations for repetitive manufacturing application measurements. The oscillations are due to the modal

structure of the junction. To compare instruments more closely, we could justifiably apply a smoothing filter value of  $1E/0.05E=20$ . This was not done for the charts presented. Instead the actual data detail is presented and compared.

If less oscillation is desired, the Photon Goniometer data can be smoothed by using the smoothing filter. Smoothing is performed by the "running average method".

This particular customer has decided to utilize the Goniometric Radiometer in his manufacturing process because it is quicker and as accurate as his "home built" system, and data collection will be more easily automated using the ActiveX mechanism of the Goniometric Radiometer Acquisition and Analysis Software.



