Chapman Instruments

Glass Disk Roll Off Measurements: Using a Chapman Instruments Non-Contact Surface Profiler

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Introduction

The measurement of the surface topography of disk media is an important issue in the performance of disk drives. Several different types of disk media measurements can be useful during polishing and texturing stages of the disk: edge profile of the disk (or duboff); disk roughness; and circumferential (or circular geometry) measurements. It is during these crucial stages that the evaluation of the disk surface takes place. Figure 1 shows the concept for these typical disk measurements.

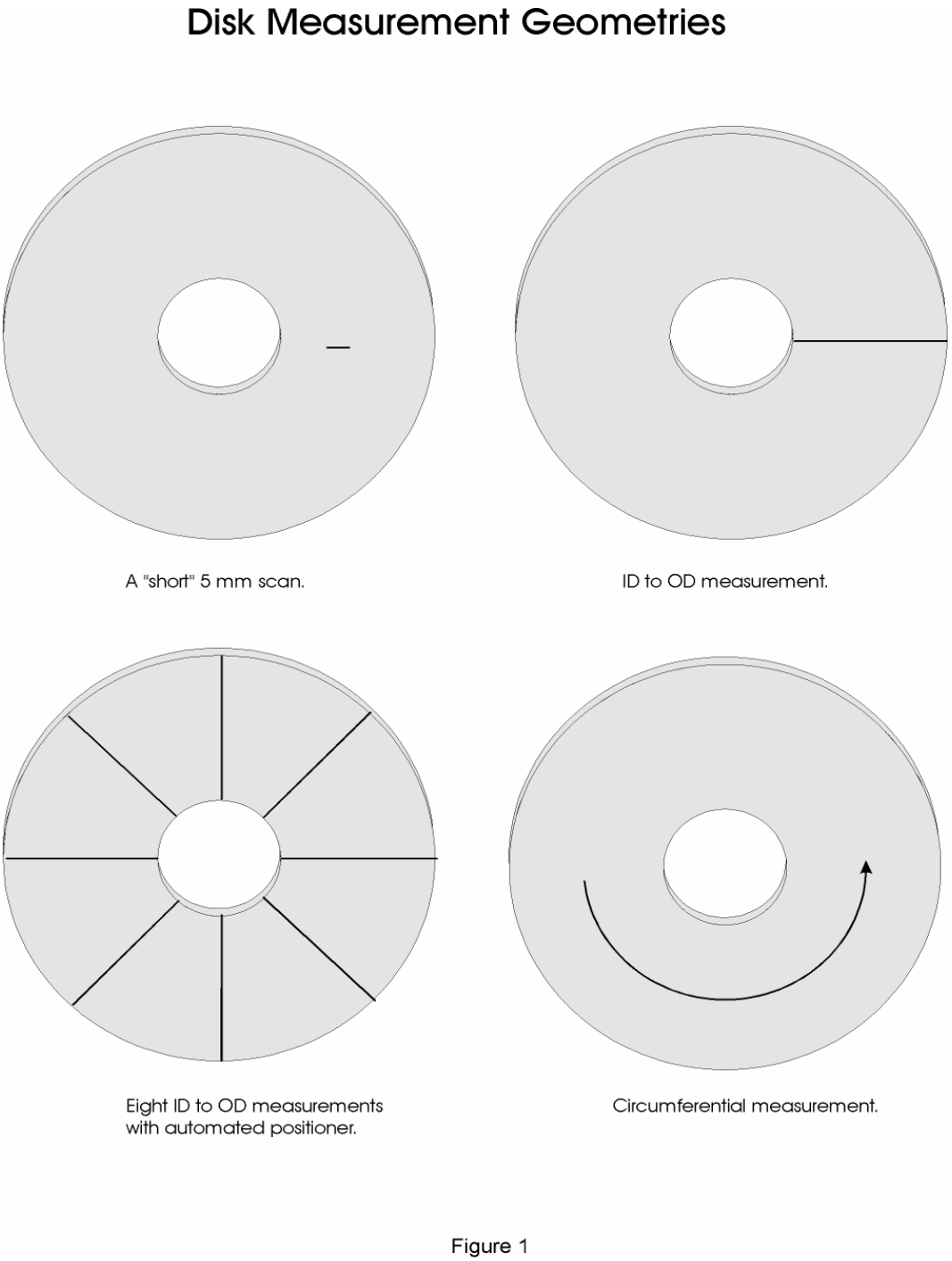

Figure 1

Methods/Examples

Edge Roll off of a Glass Disk

The capability of measuring across the disk edge can be useful in examining the extent of the outer disk area for disk recording. The data measurements can then be combined with the roughness data, thereby, offering the advantage of only needing one instrument type to provide several measurements in one data record.

An example of this type of measurement is shown in Figure 2. The measurement was set up to measure a 65 mm diameter glass disk, 0.6 mm thick. The scan length for the measurement was set for 4.5 mm, and configured to scan across the disk edge. The software automatically calculates the edge and displays the resulting profile. This same figure shows the roughness data calculated over the first 3 mm of data. Two repeat scans for the roll off are shown in Figure 2 below. This disk had a ski jump at the edge of the disk as confirmed by the disk supplier

Disk Edge Measurement – Glass Disk

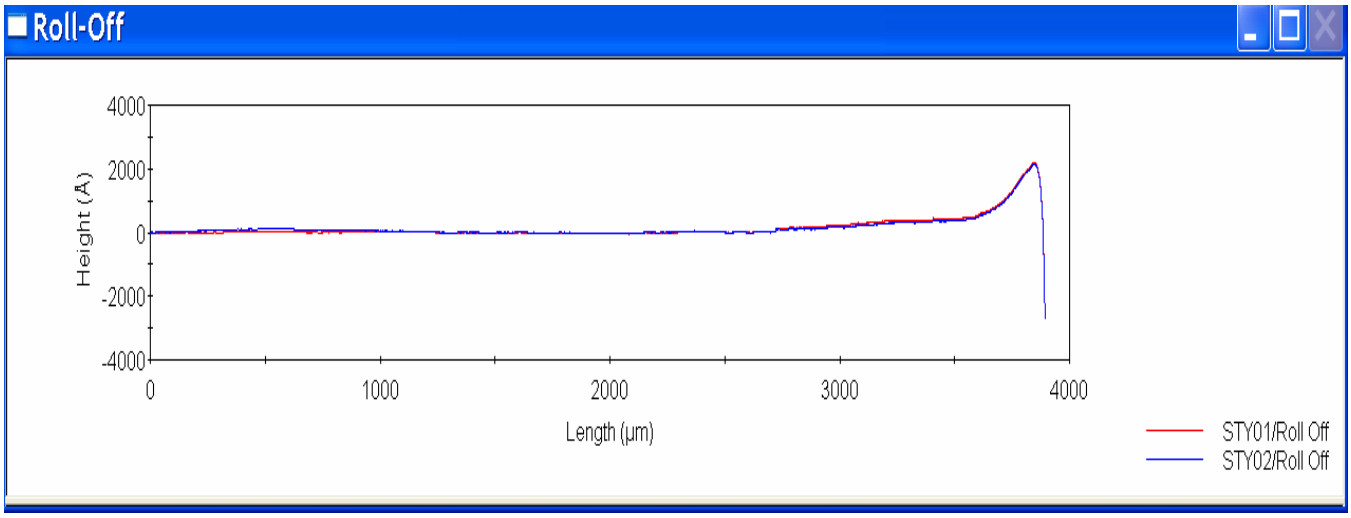

Figure 2

Edge Roll Off and roughness of a Glass Disk

Figure 3 below shows a combination of the roll off the roughness and the roughness statistics for both repeat scans. The data shows the capability for the Chapman system to measure the surface of glass disk. Several roughness parameters are shown, including the roughness average, Ra; Rt, Rq and Rz. Any of these text parameters can automatically be saved to a text file, or exported through a network to an external computer.

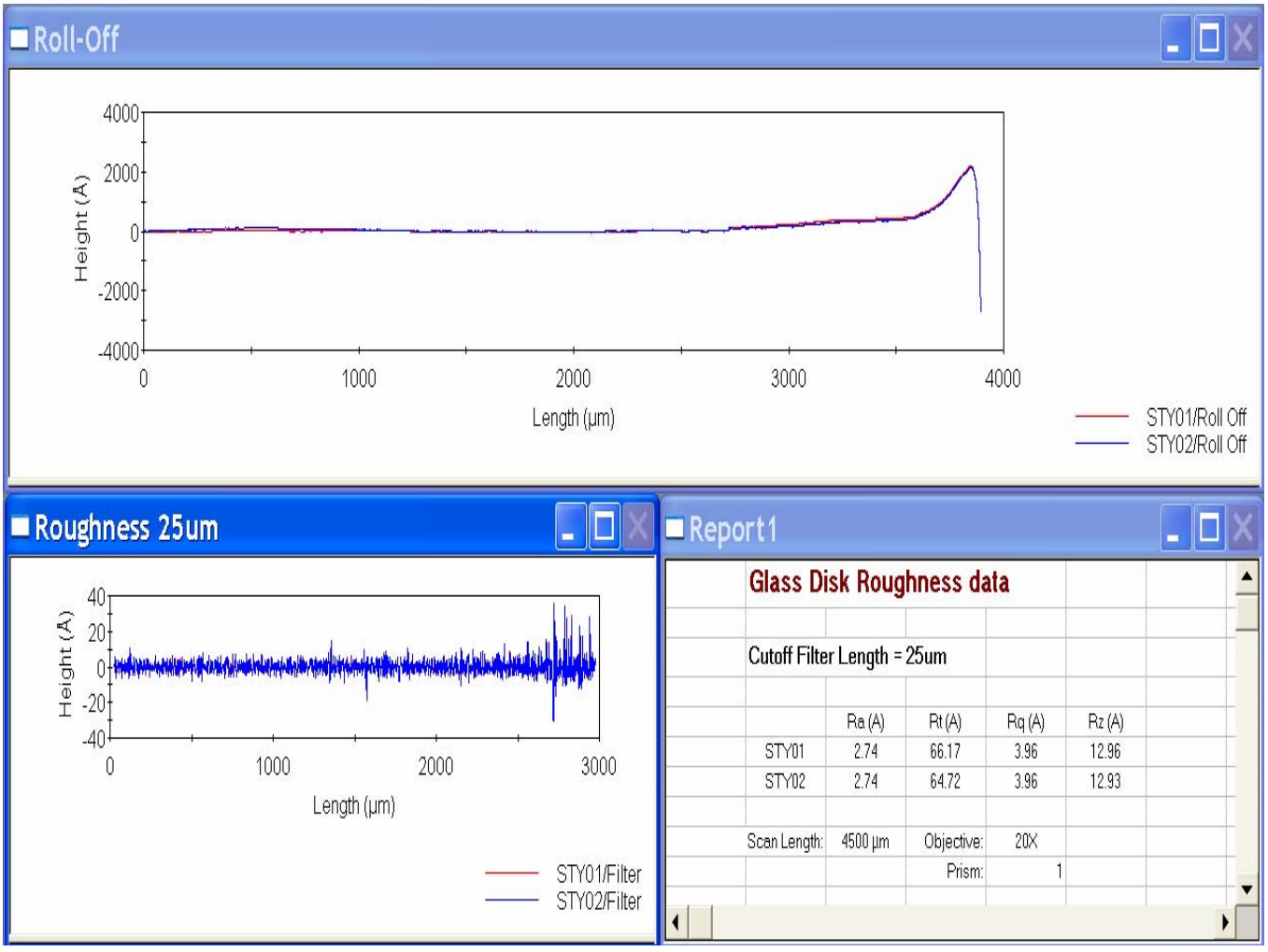

Figure 3

Focus on the Top Surface of a Glass Disk

Glass disk measurements with Chapman system profilers are easier than with other optical systems. Maintaining good focus is easy with the Chapman system; only the top glass surface is measured. There is no background effect from the back surface. The focused beam is very large after traveling trough the glass to the back surface, with no effect on the measurement system. Figure 4 below shows a concept drawing of a focused beam on the glass disk surface. The red color shows the incident focused laser beam, and the yellow shows the de-focused beam on the back surface.

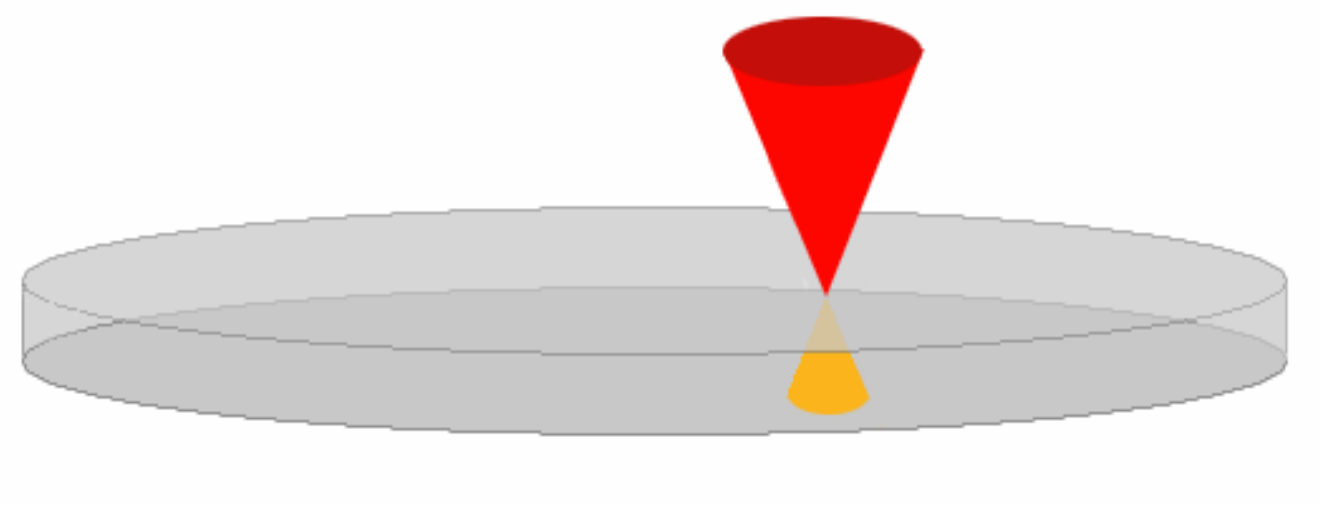

Figure 4