

Comparison of Rocking-Mode Axes Predicted by System Identification with Axes Revealed by Interferometric Measurements

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As indicated in Figures 1 and 2, identification of a prototype microgyroscope has shown that the rocking-mode axes are skewed with respect to the natural device axes, determined by the silicon springs of the structure. Figure 1 predicts the orientation of the rocking-mode axes. This figure is based on system identification with the methods described subsequently in this section. With system identification, one estimate of each rocking-mode axis is based on the sense electrode location, and a second estimate of each rocking-mode axis is based on the drive electrode location. Hence the two sets of predicted axes in Figure 1. The close agreement of these two sets of axes indicates the self-consistency of the identification results.

Figure 2 shows interferometric measurements of the displacements of the surface of the vibrating microgyroscope and reveals the true orientations of the rocking-mode axes. Comparison of Figures 1 and 2 shows that the axis-orientations predicted by system identification are very accurate. Of course, for microgyroscopes used in applications, such interferometric measurements will not be available, and system identification will be needed to determine the rocking-mode axes.

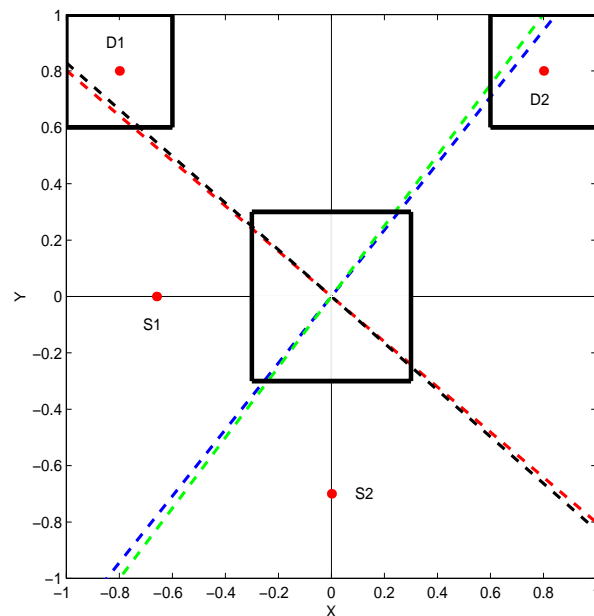
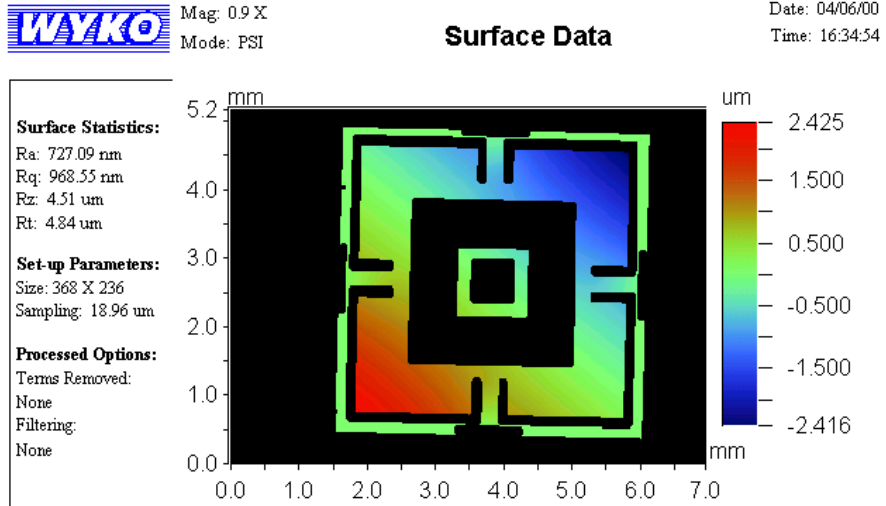
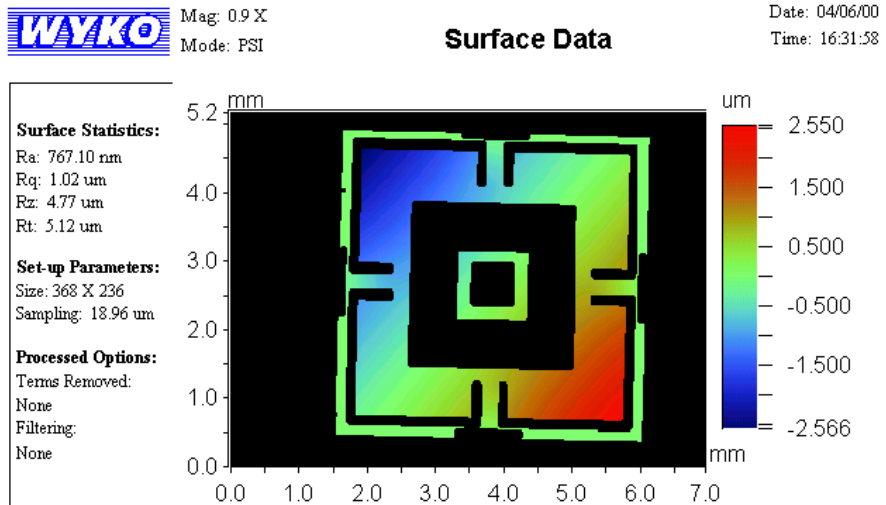


Figure 1. Rocking-mode axes predicted by system identification.



Title: Difference
 Note:



Title: Difference
 Note:

Figure 2. Rocking modes revealed by interferometry. The green diagonal bands denote zero displacement (i.e., rocking-mode axes).