

采用光学放大提高光电自准直仪的分辨力

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基金项目:

摘要:

要提高自准直仪的准确度, 首先要提高分辨力。为了能有效地提高分辨力, 采用了在自准直仪光路中加入放大光路, 对自准直像及其位移量进行放大的方法。通过样机研制, 自准直仪的最小显示值达 $0.001''$, 含示值跳动量的分辨力小于 $0.005''$, 在 $\pm 10''$ 测量范围内的示值误差为 $\pm 0.01''$, 在 $\pm 50''$ 全量程的示值误差为 $\pm 0.02''$ 。自准直光路中增加光学放大环节, 能有效地提高自准直仪的分辨力, 而且对静态和动态数字式自准直仪都能适用。

关键词: 小角度测量; 高分辨力; 光学放大; 自准直技术

Using optical zoom to improve the resolution of photoelectric collimator

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Abstract:

The effective way to improve the accuracy of the autocollimator is to improve the resolution. The optical zoom is added in the optical path of collimator in order to effectively improve the resolution. The collimation image and the displacement are amplified by using the method. A prototype is developed. The smallest indicating value of the autocollimator is $0.001''$. The resolution is less than $0.005''$ including indication beating. The indication error is $\pm 0.01''$ in the measure scale of $\pm 10''$. The indication error is $\pm 0.02''$ in full measurement scale of $\pm 50''$. The resolution of autocollimator can be effectively improved by adding optical zoom in the optical path of collimator. The method can be applied in both static and dynamic digital autocollimators.

Keywords: Small-angle measurement; High resolution; Optical zoom; Autocollimation technology

投稿时间: 2010-06-20

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