

# **Optical Wafer Height and Tilt Sensor for Electron Beam Lithography System**

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## **ABSTRACT**

Since lithography systems have limited depth-of-focus, precise and real-time measurement of wafer height is important for the image quality control. The traditional optical height sensor for electron beam lithography system consists of two basic components: a light source to illuminate the wafer surface and a detection surface to receive the reflected light beam from the wafer. Mathematics study of this type of height sensor shows that they will fail to differentiate the height difference of the wafer from the tilt of the wafer. In order to obtain the tilt information, height sensors with more complicated designs are used, and examples of these designs are briefly reviewed. A new design of wafer height sensor is proposed here. By adding an independent detection surface, the new design is able to obtain wafer height and tilt information without using complicated optical design, which will result in easy alignment and calibration. The algorithm of height measurement for this design is discussed in detail. The steps of calibration are also provided.