Design of line beam optics for microscopy

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In the industrial inspection system, one needs to make line beam and scan the specimen to make sure if there are some defects. Most of light source, however, shows a distinct elliptical Gaussian profile. So we should redistribute energy into line beam and make it homogenize. Homogenizing and beam shaping are required microscopy and lithography as well. In previous research, various beam shaping method have been developed. Hoffnagle et al[1] developed a refractive beam shaper using two specially designed aspherical lenses. T. Kajava et al[2] developed beam shaper using diffractive optics.

Here we propose line beam optics for beam shaping. The optics consists of 4 modules: Beam expanding module, homogenizer module, field lens module and projection lens module. Beam expanding module consists of two cylindrical lenses. Each lenses can control horizontal and vertical size of beam. Homogenizer module consists of a cylindrical micro-lens array 22 lenses in horizontal axis and 24 lenses in vertical axis. Field lens module consists of two field lenses which control horizontal and vertical axis. Projection lens reduces the size of beam. Doublet cylindrical lens used by projection lens. The beam getting through projection lens illuminates specimen. Figure 1 shows a schematic view of proposed line beam optics.

Figure 1 Line beam Optics

References

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