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微光技术

头盔式单目微光夜视仪中非球面物镜系统的设计

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摘要 为提高头盔式微光夜视系统的成像质量，并满足整个夜视系统体积小、重量轻的指标要求，提出了非球面物镜系统的设计。通过在物镜系统中引入高次项非球面结构，不仅使系统成像质量在空间频率为40lp/mm时，轴上传递函数可以达到0.62，轴外可以达到0.42；而且光学系统的质量约为300g，物镜由原来的9片减少到6片，仪器总长由原来的81mm减少为72mm。设计结果表明，在头盔式单目微光夜视系统中采用非球面结构可以使系统的成像质量有很大提高，并可使系统结构大大简化。

关键词 微光夜视仪 高次非球面 物镜系统设计

分类号

Design of aspheric lens in helmet mounted LLL night vision system

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Abstract To improve the imaging quality of lens used in the helmet mounted LLL night vision system and make lens small in size, light in weight, the lens with the high order aspheric surface is designed. According to the theory of the aberration, the lens of the helmet mounted night vision imaging system is designed to meet the demand. When spatial frequency is 40lp/mm, on axis MTF can reach 0.62 and off axis MTF 0.42. On the other hand, its total weight is about 300g，the number of lens is reduced from 9 to 6, the total length of the system from 81mm to 72mm. The analyzed results show that the construction of the aspheric surface for helmet mounted LLL night vision systems can make its lens configuration simple.

Key words LLL night vision system high order aspheric surface lens design

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