

光学设计

LCoS背投光学引擎中变焦投影物镜设计

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摘要 设计出变焦投影物镜,能满足相同光学引擎、相同屏幕位置下不同屏幕尺寸的需要。考虑到所设计的系统为大相对孔径、中等视场和小变焦比,从变焦理论出发,采用正组补偿的机械补偿法,对变焦组进行合理的倍率选段,求出了高斯解;然后分组元选用合理的初始结构,利用ZEMAX光学设计软件进行优化设计,解决了变焦系统畸变难以控制的问题,并使用调制传递函数对整个系统进行了综合评价。设计结果表明:该变焦投影物镜系统的光学性能和成像质量均满足设计指标要求,能应用于101.6~177.8cm的大屏幕电视。

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Design of zoom projection lens for the light engine of LCoS rear-projection TV

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Abstract A zoom projection lens is designed to meet the requirements of different sizes of big rear-projection screen with the same light engine and screen location. Since the optical system to be designed should have a big relative aperture, middle field of view and small zoom ratio, the concept of zoom system is selected. The positive mechanical compensation configuration was adopted, the proper magnifications of the zoom configuration were chosen and the Gauss roots were derived. The appropriate primal configurations based on each subassembly are chosen. The optimization design is carried out with ZEMAX optical design software. The distortion of the zoom system is improved, and the modulation transfer function (MTF) is used to evaluate the system. The design and assessment results indicate that the optical performance and image quality of the zoom projection lens system meet the design specification, and can be used in big screen TV, ranging from 101.6cm to 177.8cm.

Key words [light engine](#) [zoom projection lens](#) [mechanical compensation method](#) [modulation transfer function](#)

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