

DEVELOPMENT OF LIGHT GUIDES FOR THE CAMERA OF CANGAROO-III TELESCOPE

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The camera of the CANGAROO-III Cherenkov Telescope is consists of many photomultiplier tubes (PMTs), with significant dead space between the PMTs. Light guides reflect photons directed at dead spaces to the effective area of a PMT. We performed Monte Carlo simulations for various shapes of light guides to evaluate their performance, compared with experimental values, and determined the optimal shape of the light guide for the CANGAROO-III Telescope. The best collection efficiency was obtained for the following conditions: The cross sectional shape cut along the center line of the light guide should have the Winston cone shape, though the entrance shape is hexagonal, and the gap between the light guide and the PMT should be as small as possible. To decrease the detectable energy threshold, good light collection efficiency is very important.