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A uniform lighting plane can be acquired by a LED array where the illuminance uniformity is decided by configuration of the LED array and the distance from the array to the target plane. For generalized Lambertian LED, the relationship between the array configuration and height of the target plane has been disclosed expressly and a simple criterion formula has been presented. However, the situation is different for LAL system based on NMDD LED. This paper proposed a method for analyzing the condition for uniform lighting generated by this type of LED. The luminous intensity distribution of a LED with freeform lens that can produce a circular pattern on the target plane was fitted. An LED array with rectangular arrangement was constructed by this type of LED and the condition for uniform lighting was derived on the basis of Sparrow's Criterion. It is found that there are multiple zero points of the second derivative of the illuminance distribution function, which helps the designers selecting the optimum separation combining the specific demands of applications. Moreover, the illuminance uniformity is not monotone decreasing with the increasing of the separation between LEDs. Other type of large view angle LED and different arrangements of LED array was investigated too. As compared with the simulated results and the calculated theory, the method of designing a LAL system based on NMDD LEDs is correct.

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