

ABSTRACT**LIGHTING OPTICAL DEVICE, REGULATION METHOD FOR
LIGHTING OPTICAL DEVICE, EXPOSURE SYSTEM, AND
EXPOSURE METHOD**

An illumination optical apparatus is able to adjust each of pupil
luminance distributions at respective points on a surface to be
illuminated to being almost uniform, while maintaining or adjusting an
5 illuminance distribution on the surface to be illuminated to being almost
uniform. The illumination optical apparatus illuminates the surface to
be illuminated (M, W), with a light beam from a light source (1). The
apparatus is provided with a pupil distribution forming device (1-4) for
forming a pupil luminance distribution with a predetermined luminance
10 distribution on an illumination pupil plane; and an adjuster (8, 9) for
independently adjusting each of pupil luminance distributions about
respective points on the surface to be illuminated. The adjuster has a
plurality of adjustment surfaces each of which is disposed in an optical
path between the pupil distribution forming device and the surface to be
15 illuminated and has a predetermined transmittance distribution or
reflectance distribution.

Figure 1