by the blending of light from the lens itself if a significant fraction of lenses are composed of stars. In this paper, we estimate the effects of lens blending on the optical depth determination and the derived matter distribution toward the Galactic bulge by using realistic models of the lens matter distribution and a stellar luminosity function. We find that the effect of lens blending is largest for lenses located in the Galactic disk. However, lens blending does not seriously affect both the determination of the optical depth and the Galactic matter distribution. The decrease in optical depth is ~20% even under the extreme assumption that lenses are totally composed of stars and disk matter distribution follows a maximal disk model, in which the lens blending effect is expected to be most severe.

DIFFUSE DARK AND BRIGHT OBJECTS IN THE HUBBLE DEEP FIELD

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We have identified dark and bright objects in the Hubble Deep Field. They are likely to be giant dark clouds and star forming regions at high redshift, respectively. These objects have been found from the difference images between images smoothed with a 0.8'' and 4'' FWHM Gaussian. This procedure eliminates the global flattening error and the local contaminations from brighter stars and galaxies.

From the images at three bandpasses (F450W ,F606W, F814W), we have identified bright peaks with heights between 0.5σ and 3.5σ, and selected the high redshift candidates by color-selection criterion ([F450W-F606W] > 1.2 + [F606W-F814W]). Bright objects typically have AB magnitudes between 29 and 31 in F606W. We have also identified dark cloud candidates with negative peaks in F450W and F606W but a positive peak in F814W.

The reality of bright objects is shown by significant cross-correlation between objects identified at different bandpasses with correlation length of 0.3'', by auto-correlation similar to that of the nearby bright galaxies extrapolated to the sample depth. The auto-correlation of dark objects is weaker than that of bright objects but is still significant.

The bright objects are thought to lie at z > 3.6 with size 1''. They are inferred to be in the process of star-formation and to be the ancestors of the present bright galaxies. From the fact that dark objects have positive peaks in F814W but negatives in F450W and F606W, these objects can be thought to be dark clouds absorbing the background UV light and emitting or transmitting light at longer wavelength. The uncertainties of the image process, such as the effects of hot pixels and the flat field error do not affect out results.