

Compact Snapshot Hyperspectral Imaging with Diffracted Rotation

Supplemental Material

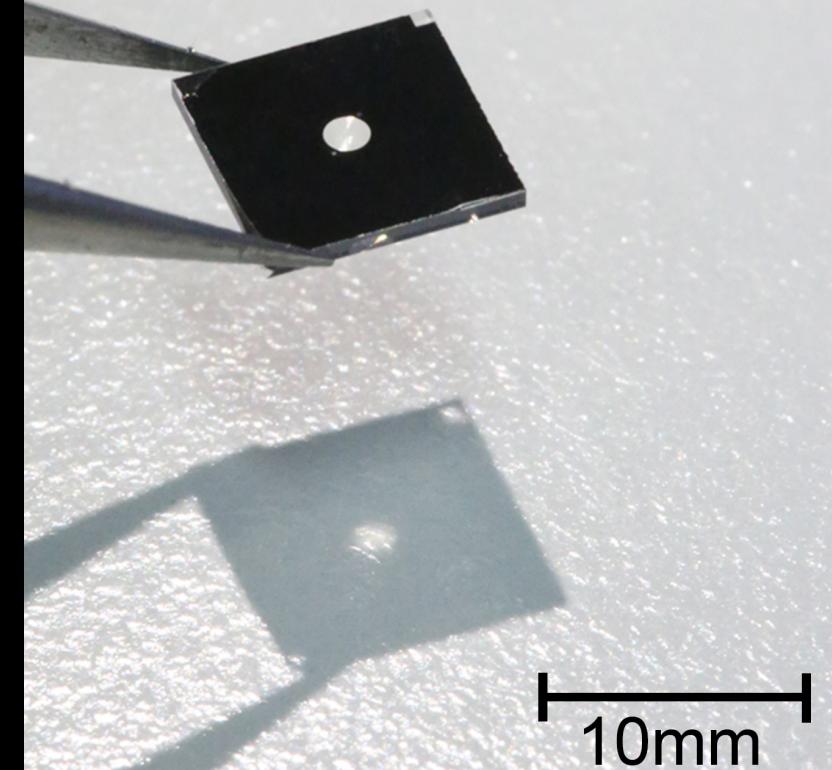
Daniel S. Jeon Seung-Hwan Baek Shinyoung Yi
Qiang Fu Xiong Dun Wolfgang Heidrich Min H. Kim

KAIST

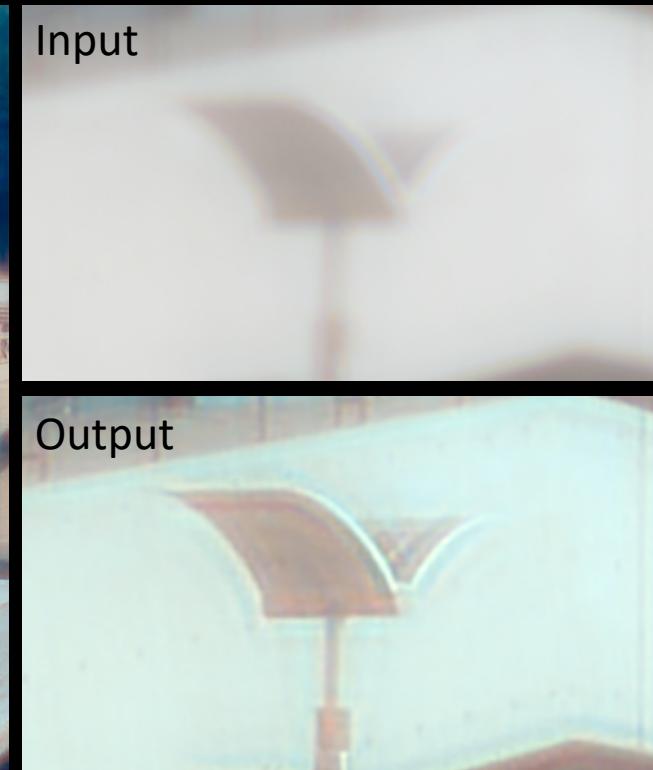
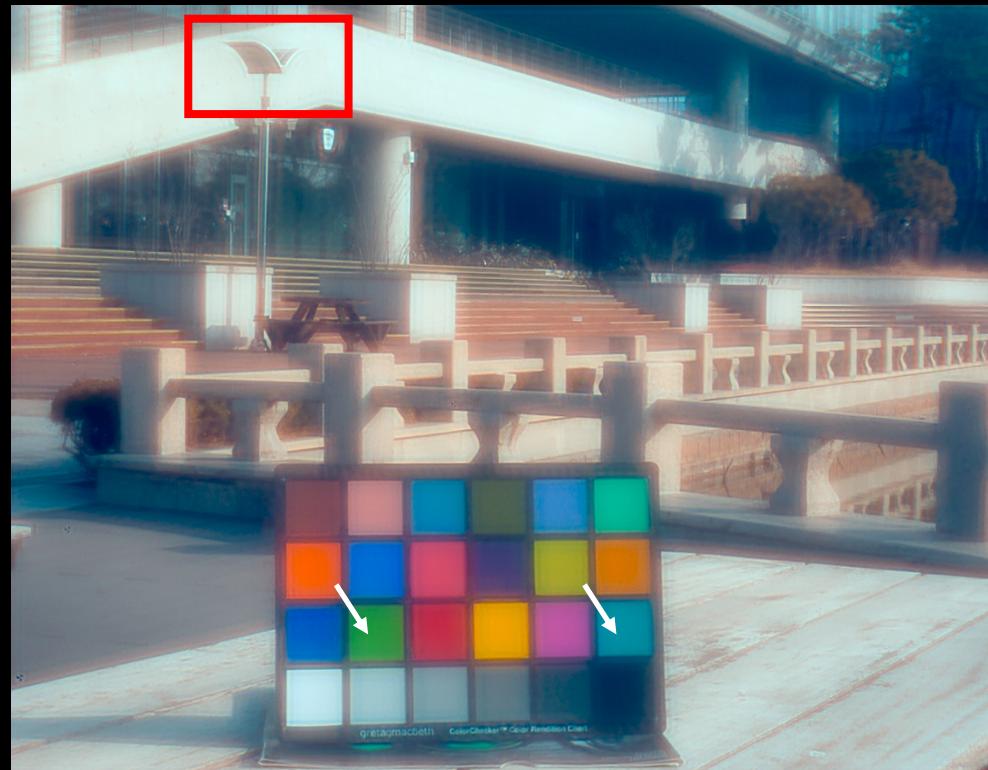
KAUST

Figure 1

(a) Our DOE & camera



(b) Reconstructed hyperspectral image



(c) Spectrally-varying PSFs

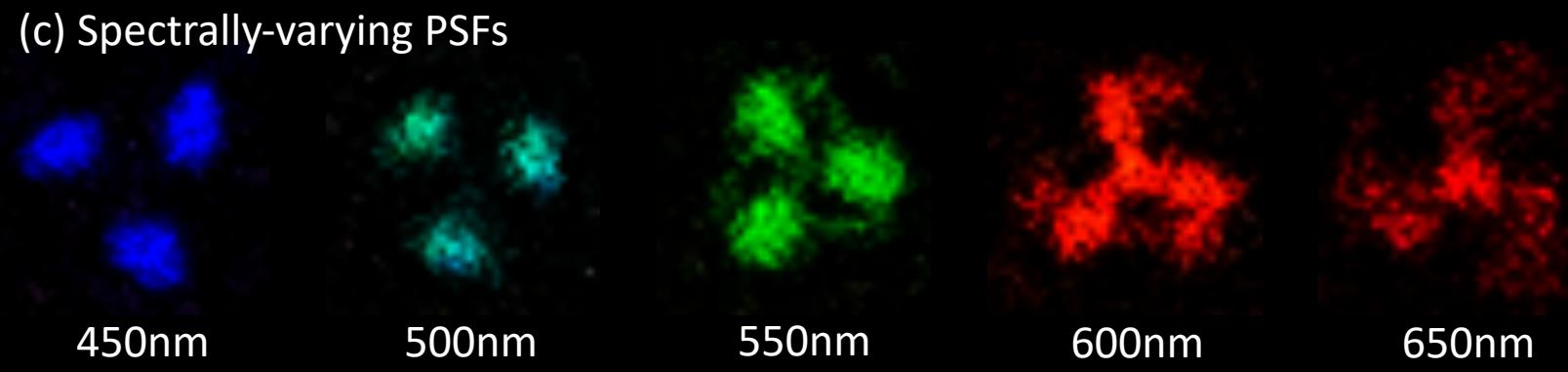
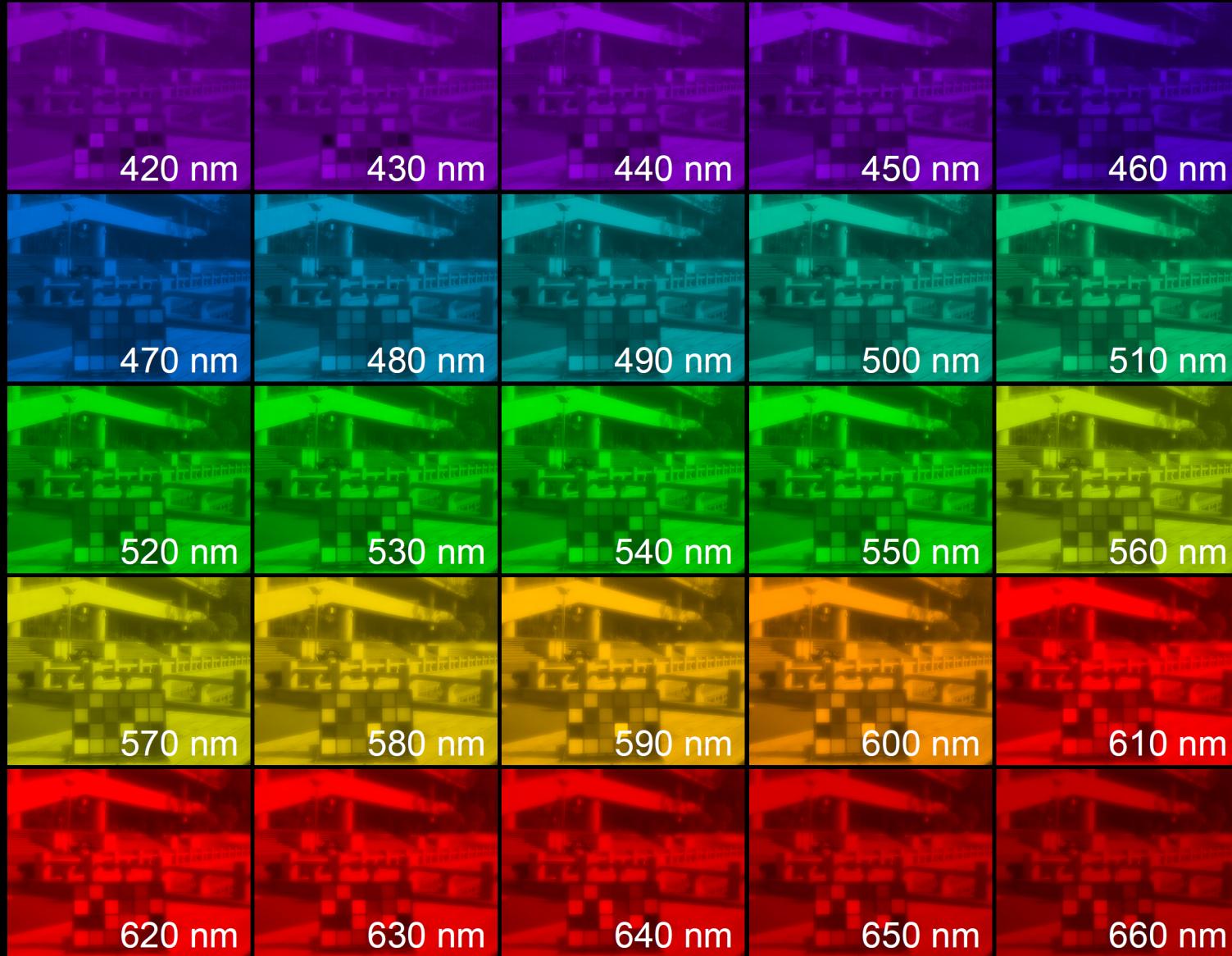


Figure 1

(c) Spectral channels



(c) Spectral plots

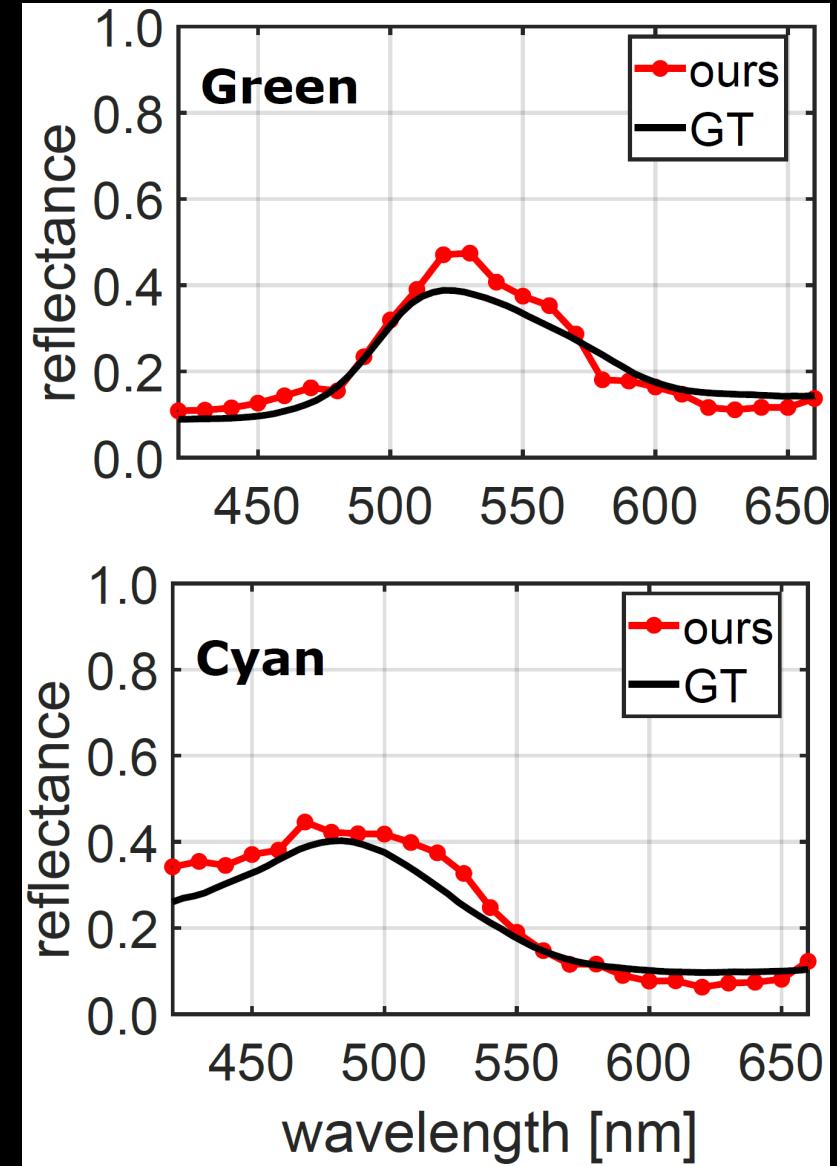
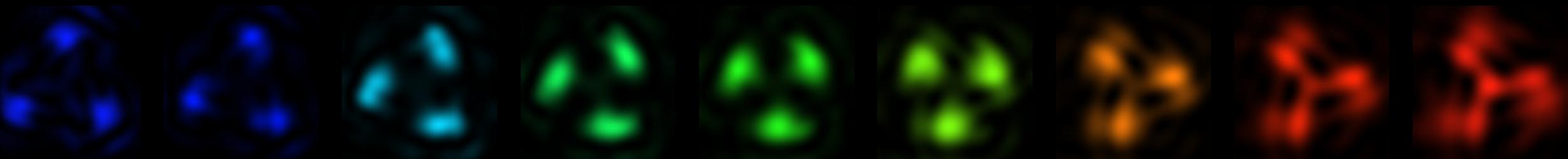


Figure 3

Fresnel lens



Our DOE



420nm

450nm

480nm

510nm

540nm

570nm

600nm

630nm

660nm

Figure 6

(a) Our fabricated DOE



(b) Measured PSFs per wavelength

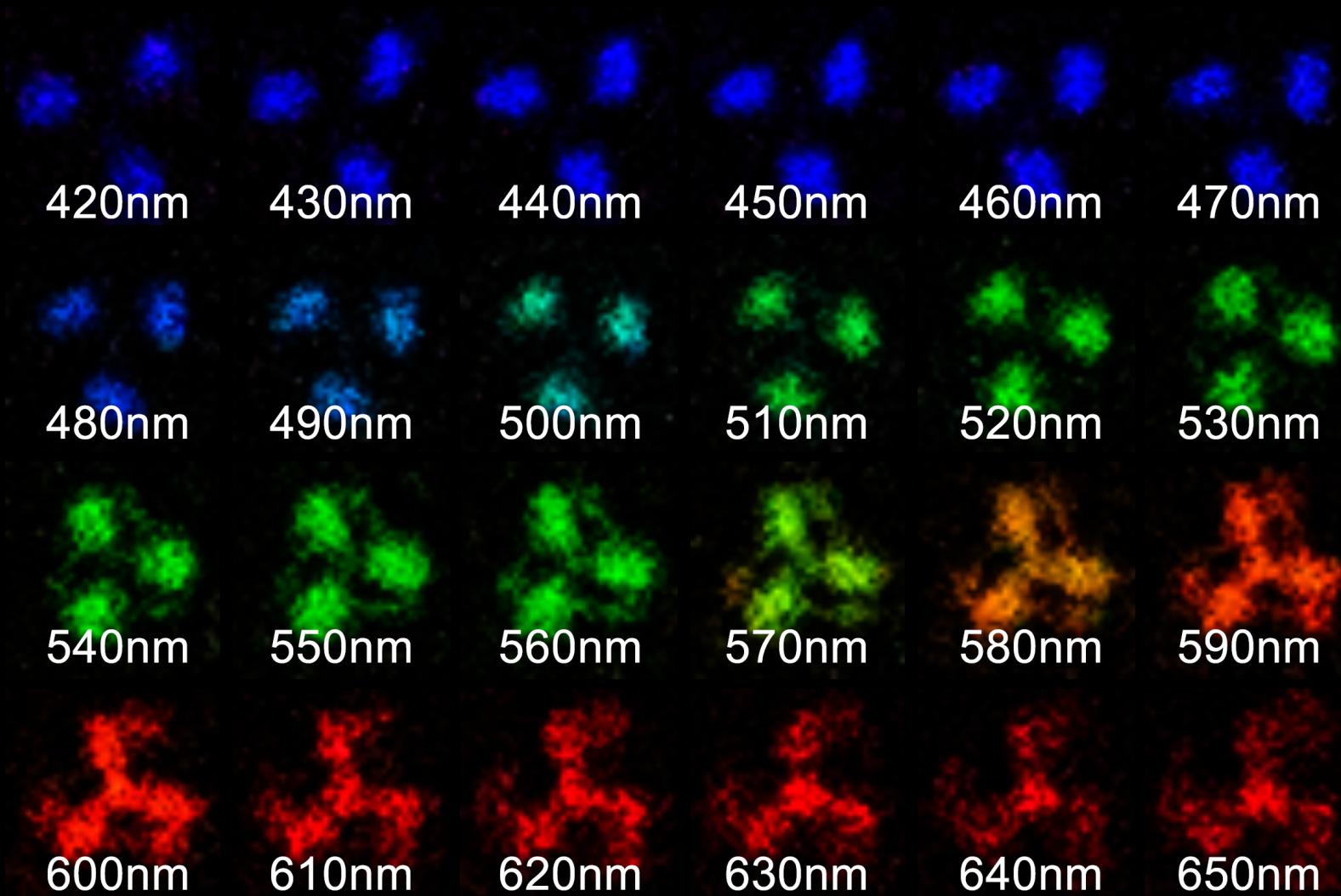


Figure 7

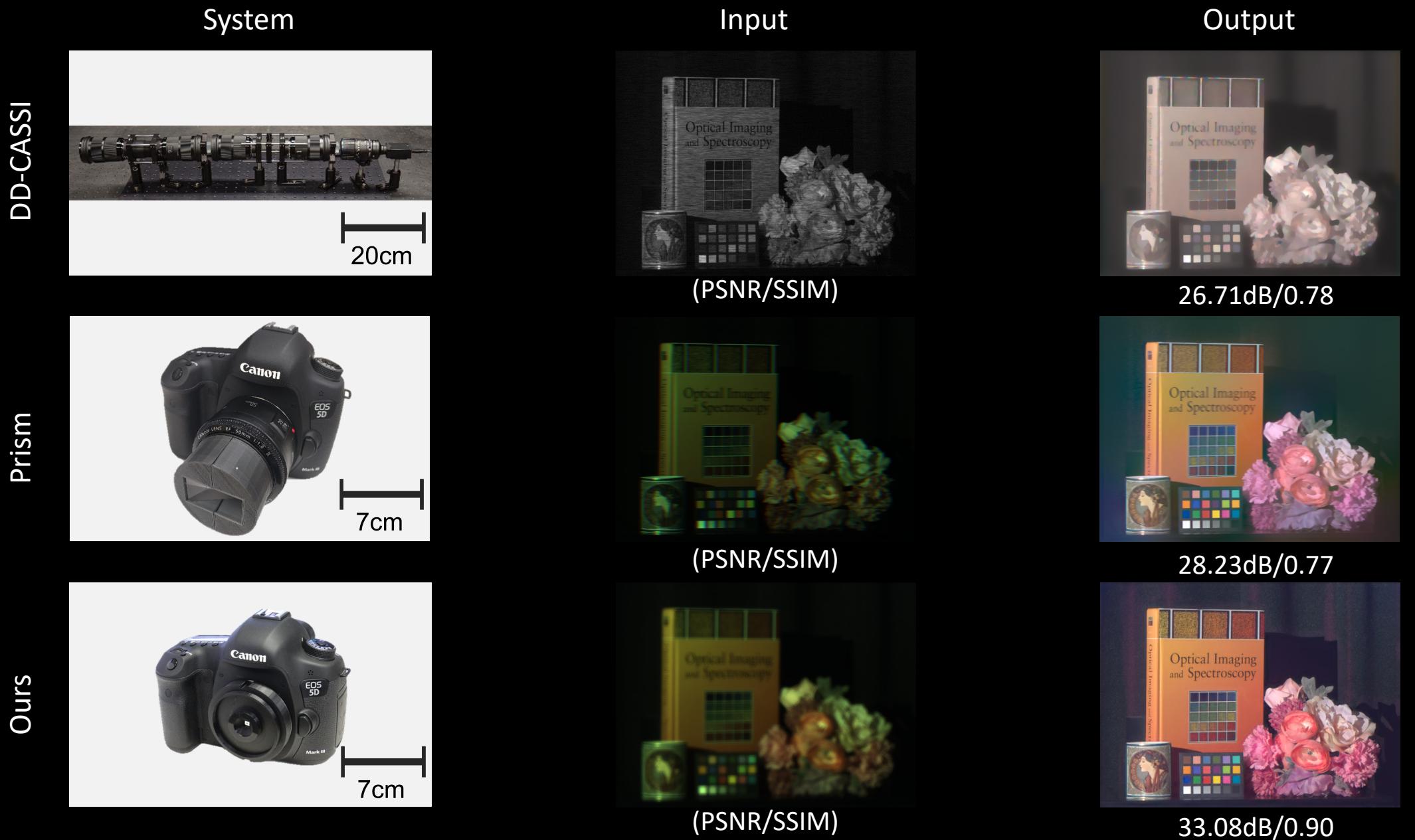
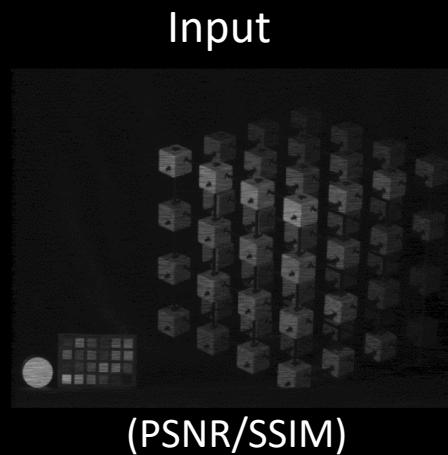
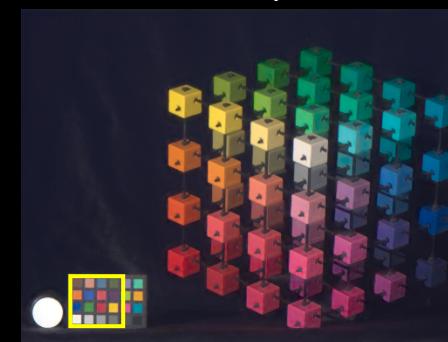
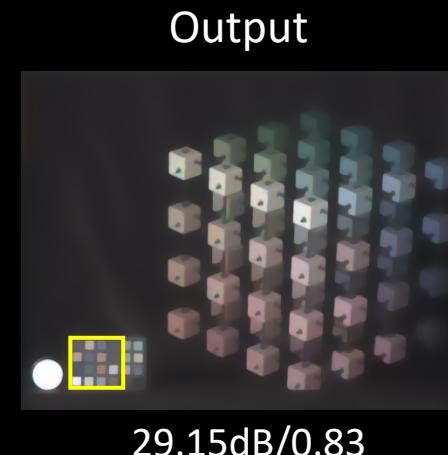


Figure 7

DD-CASSI



Prism



Ours

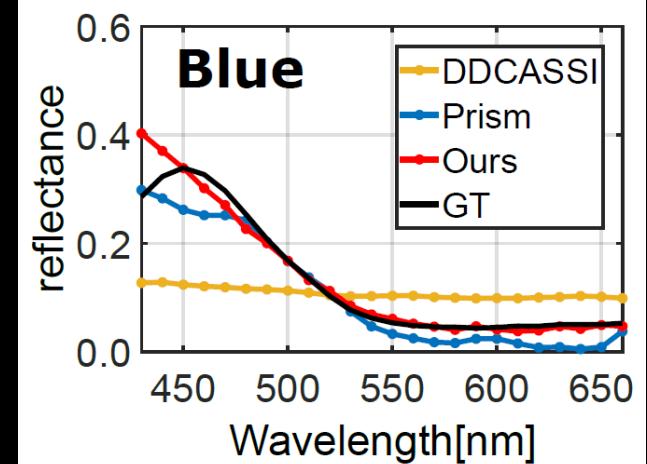
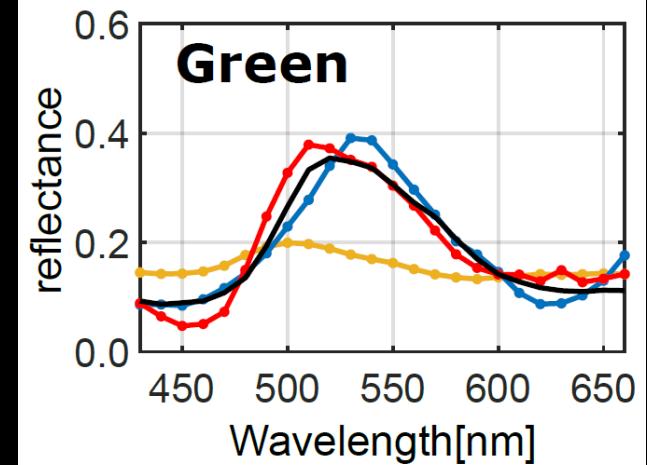
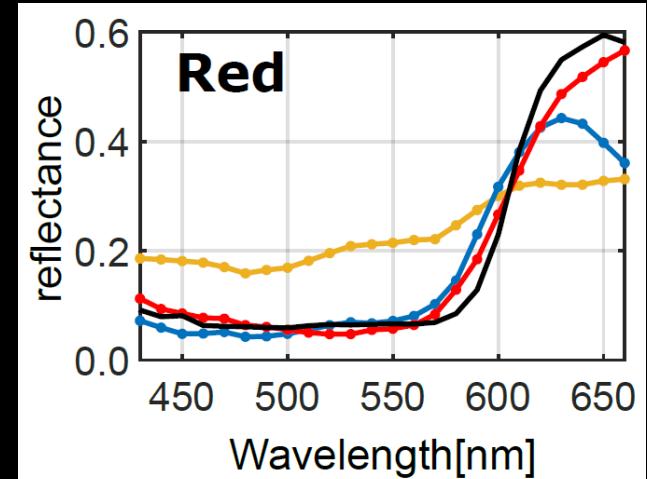
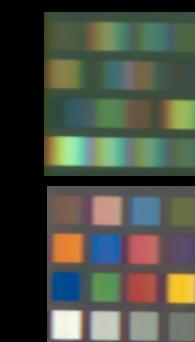
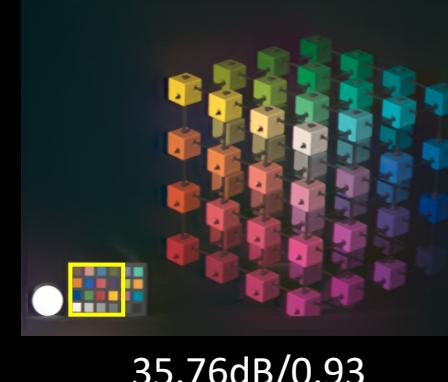
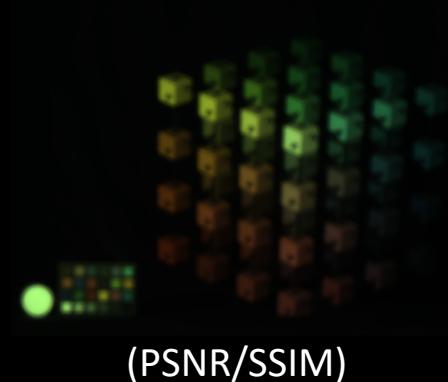
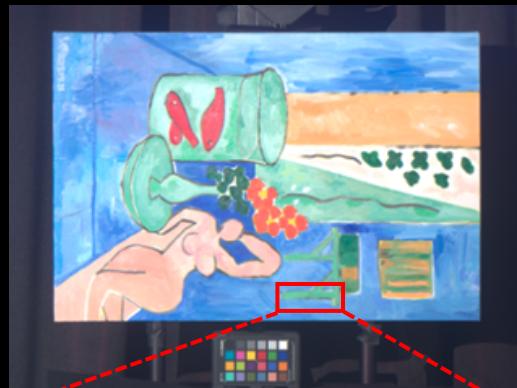


Figure 8



Ground truth (PSNR/SSIM)



TVAL3 (27.44dB/0.83)



Autoencoder (23.38dB/0.62)



ISTA-NET (28.24dB/0.78)



Ours (29.49dB/0.86)

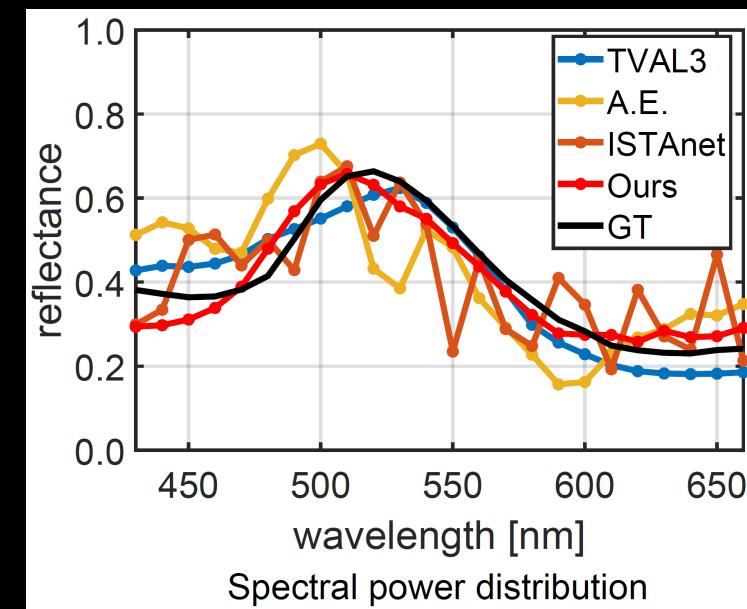
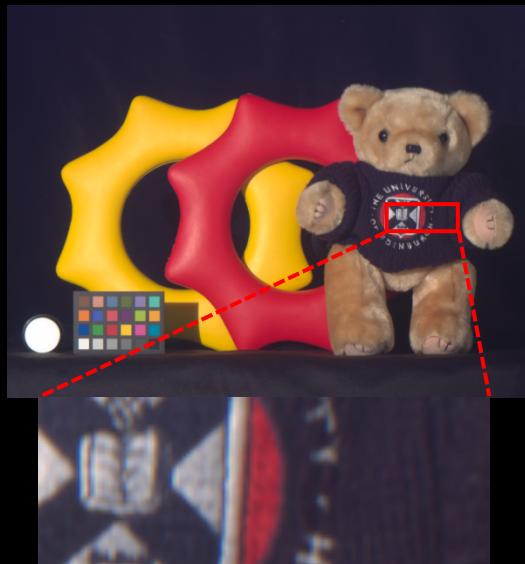
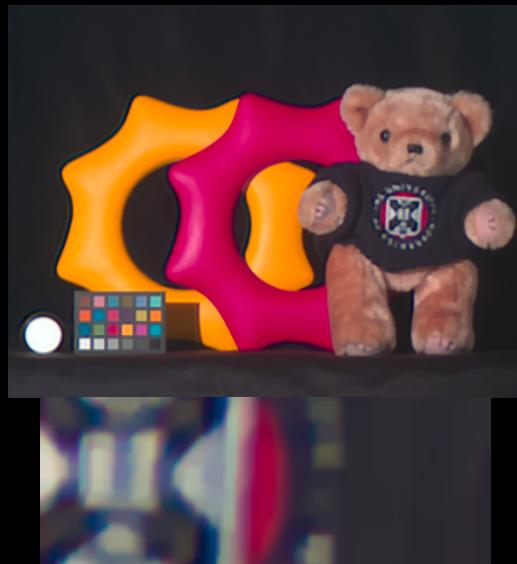


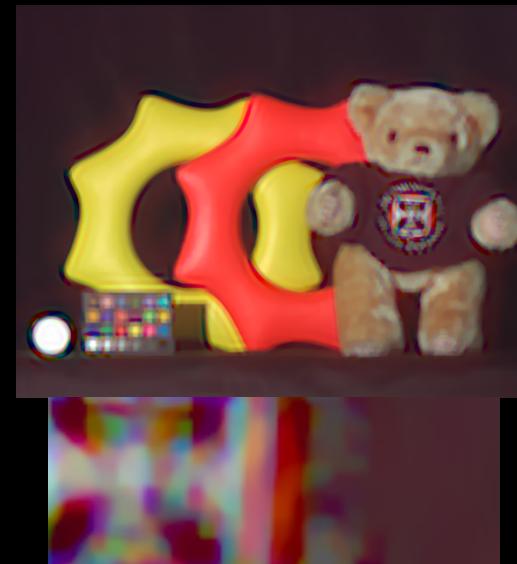
Figure 8



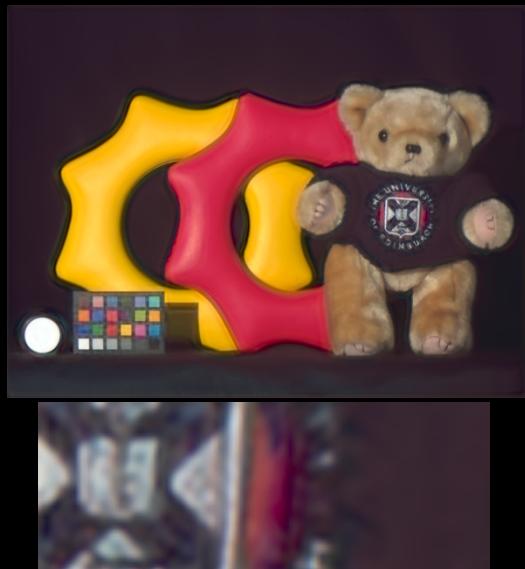
Ground truth (PSNR/SSIM)



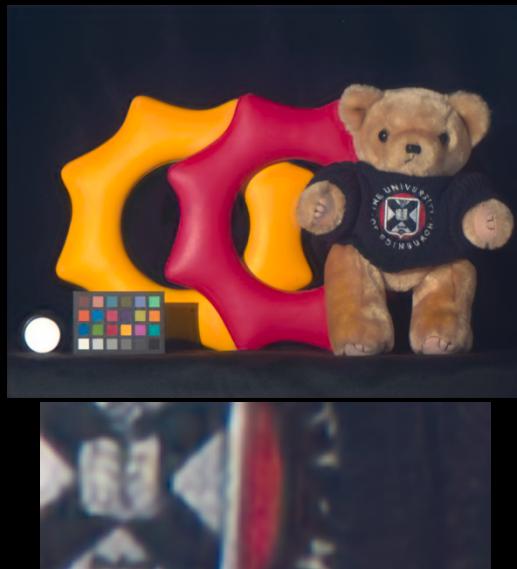
TVAL3 (28.52dB/0.84)



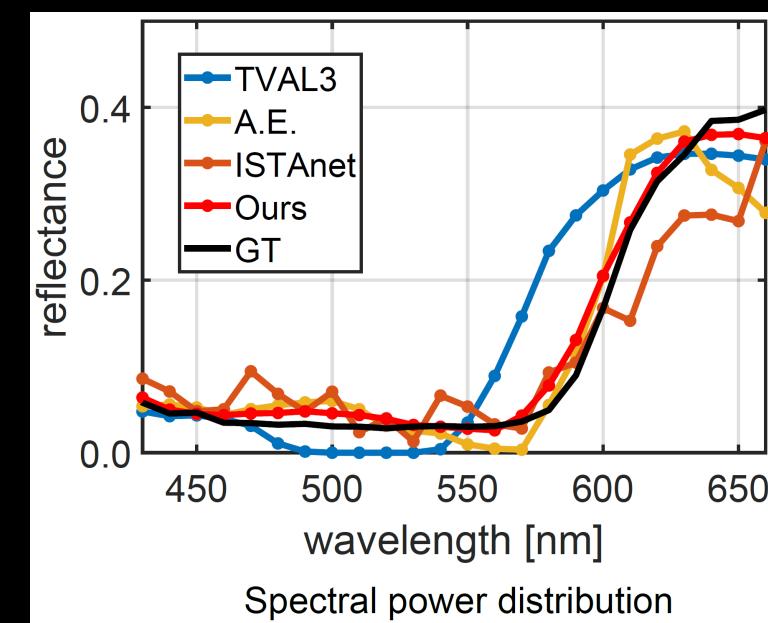
Autoencoder (23.42dB/0.75)



ISTA-NET (31.96dB/0.86)



Ours (33.93dB/0.92)



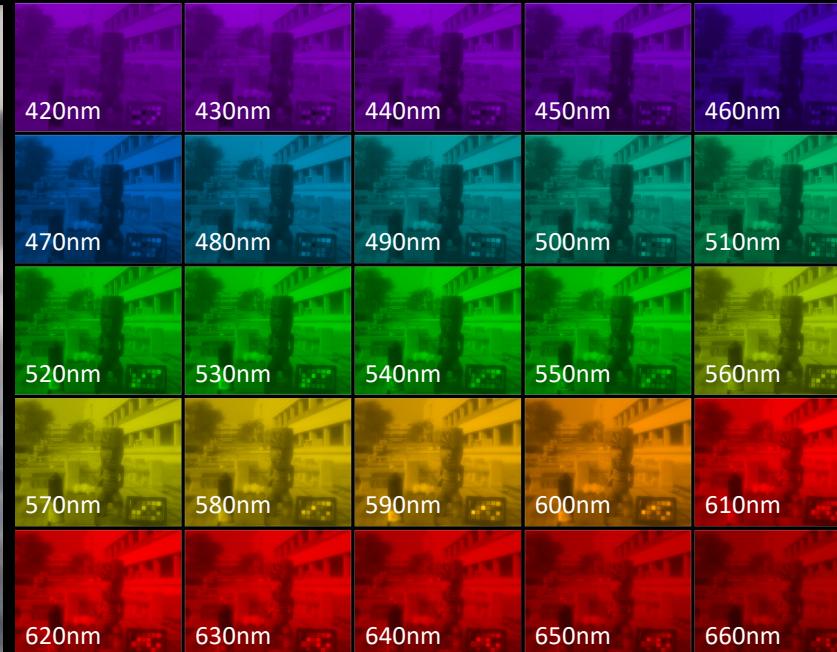
Spectral power distribution

Figure 9

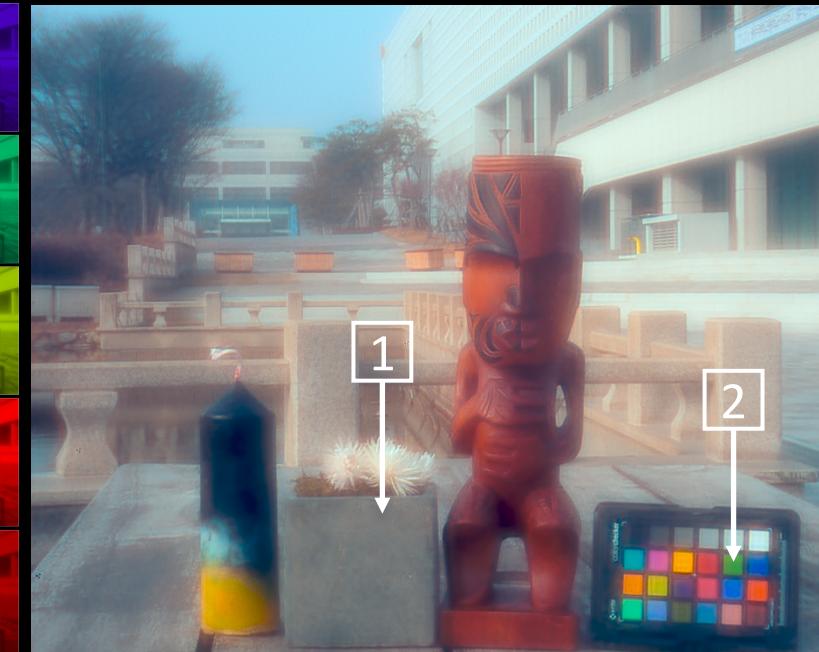
Input



Spectral channels



Hyperspectral image



Spectral plots

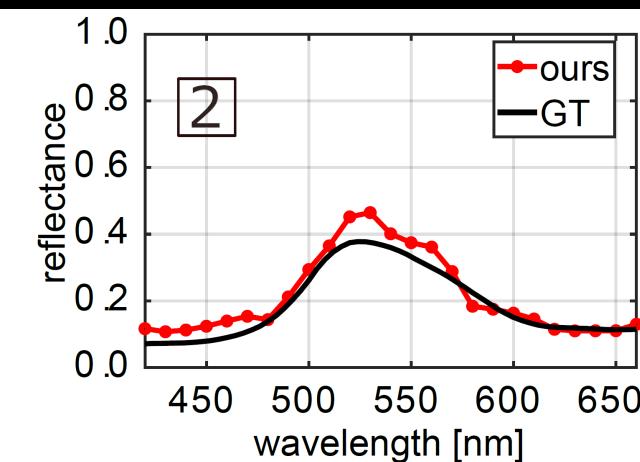
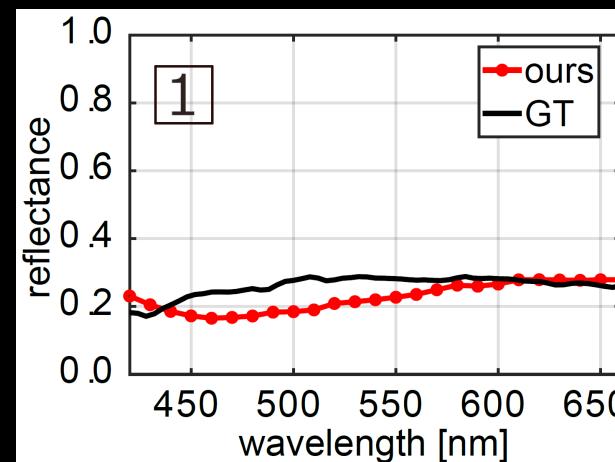
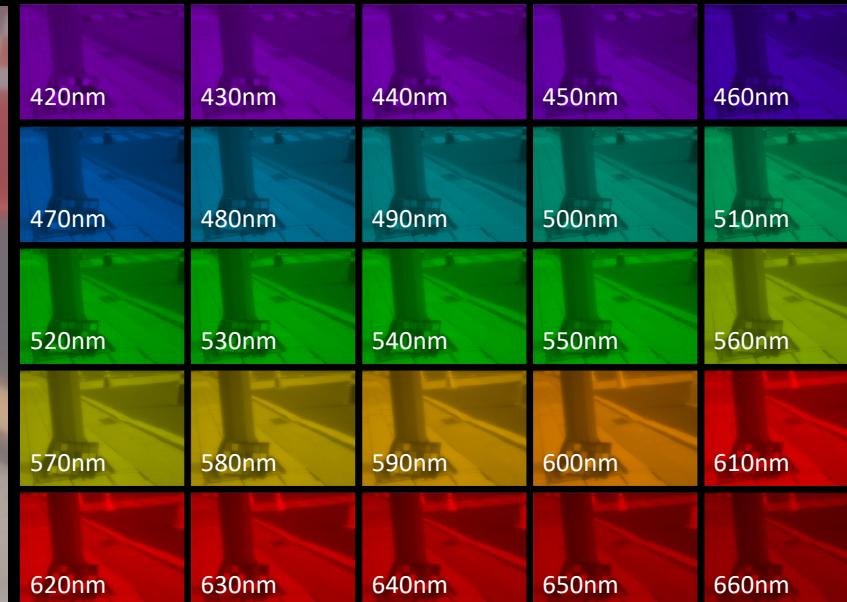


Figure 9

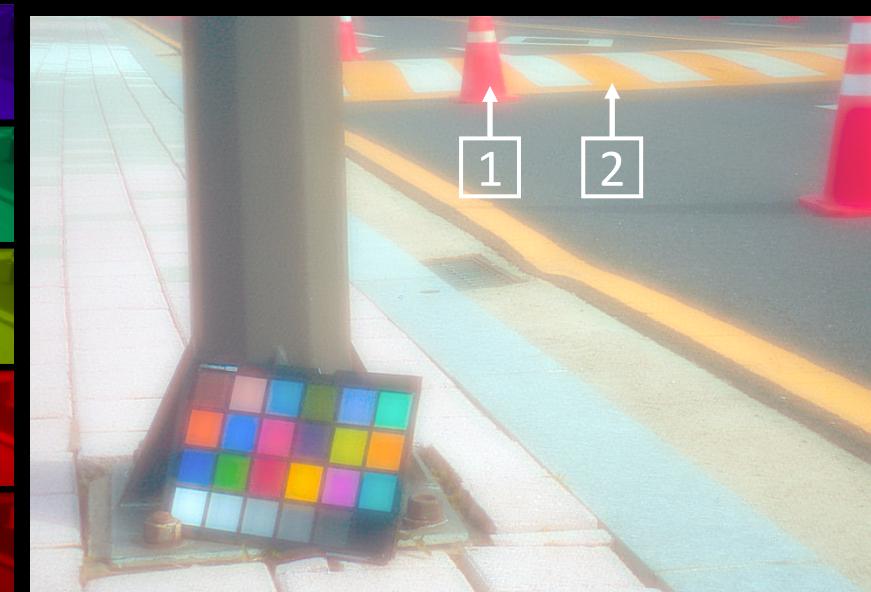
Input



Spectral channels



Hyperspectral image



Spectral plots

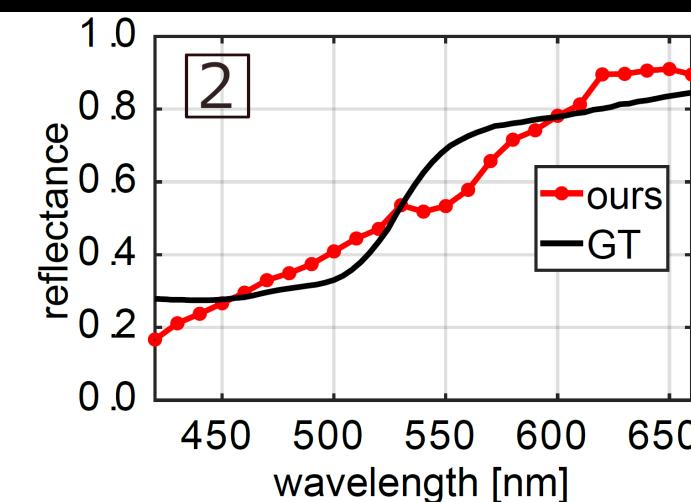
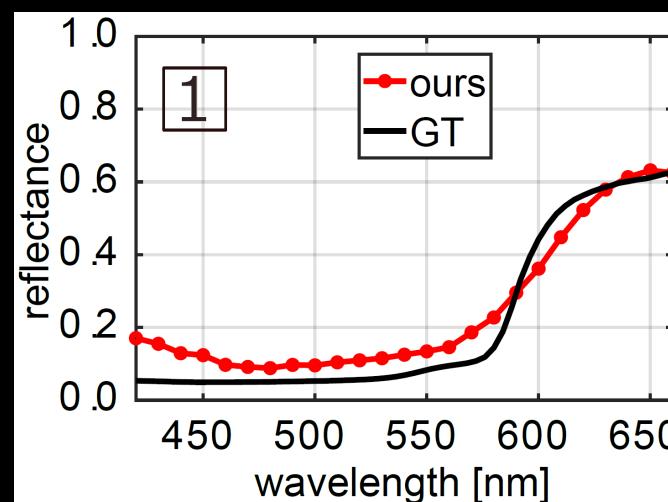
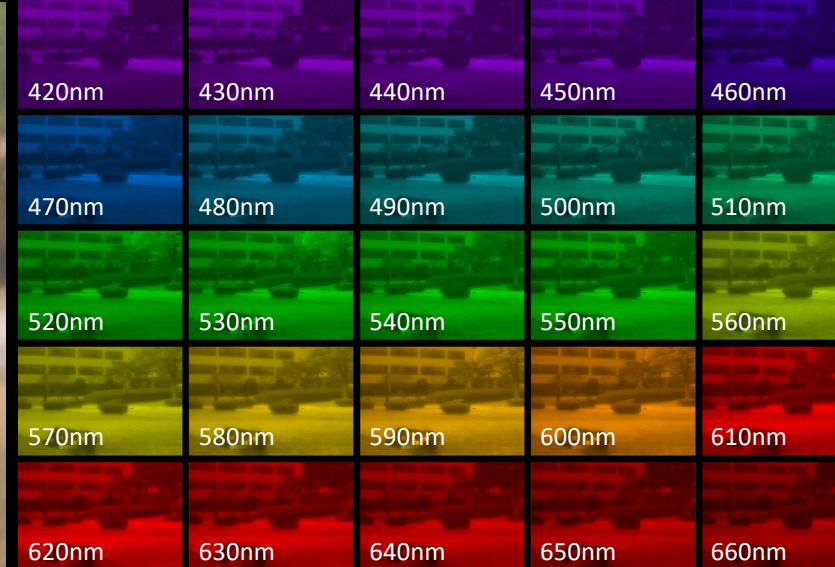


Figure 9

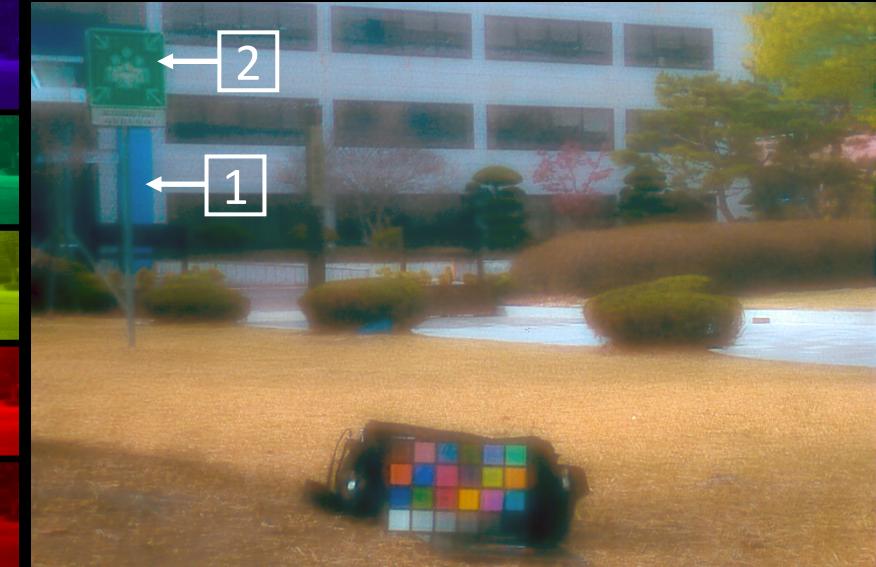
Input



Spectral channels



Hyperspectral image



Spectral plots

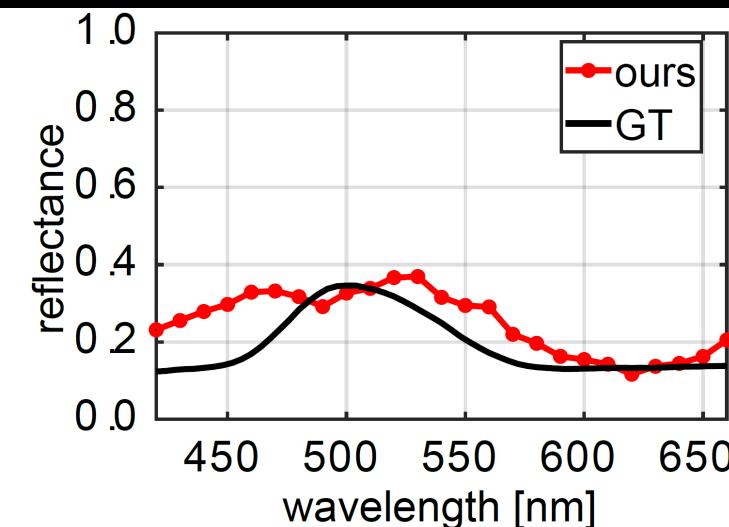
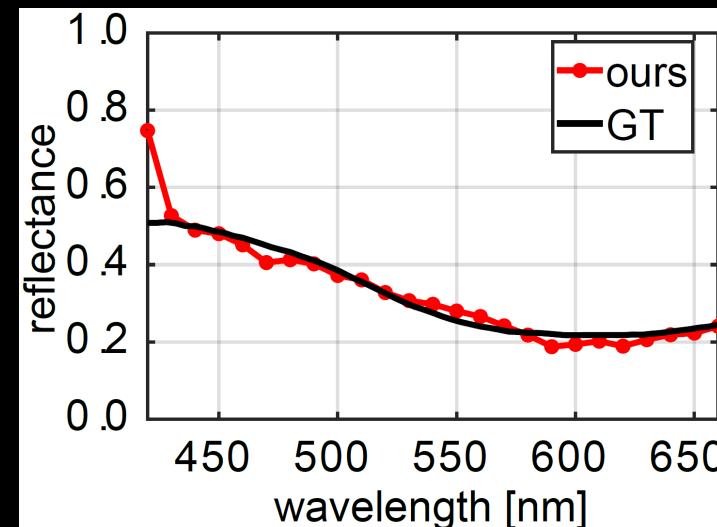


Figure 10

(a) Spectral accuracy

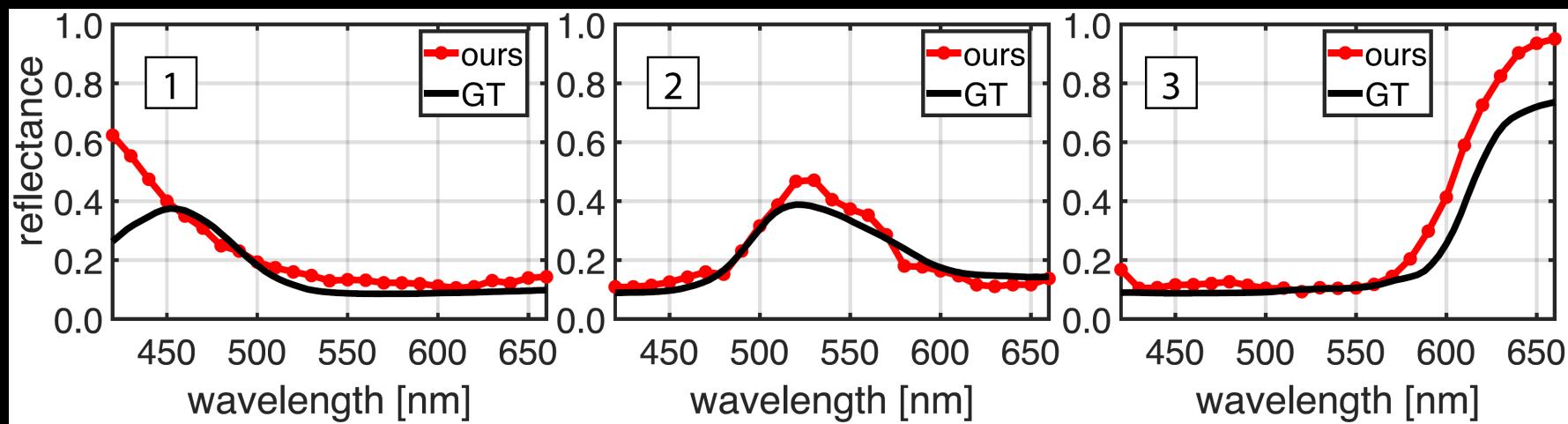
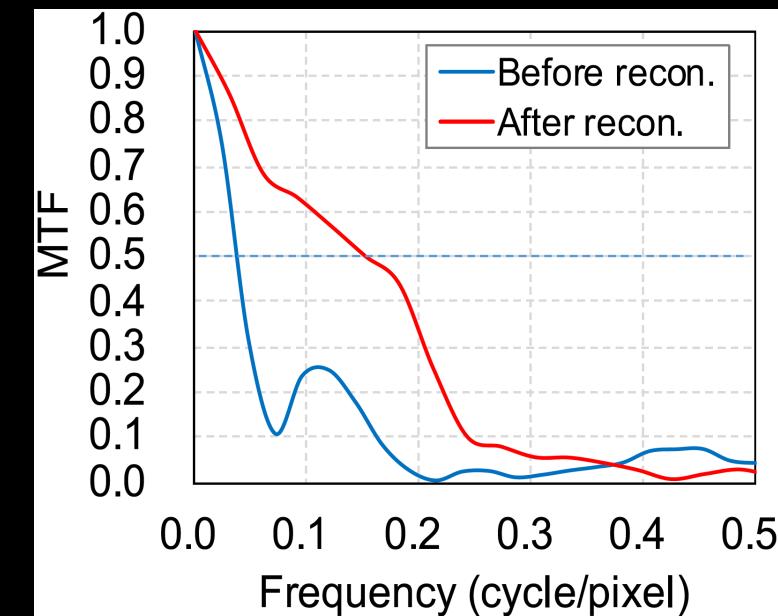
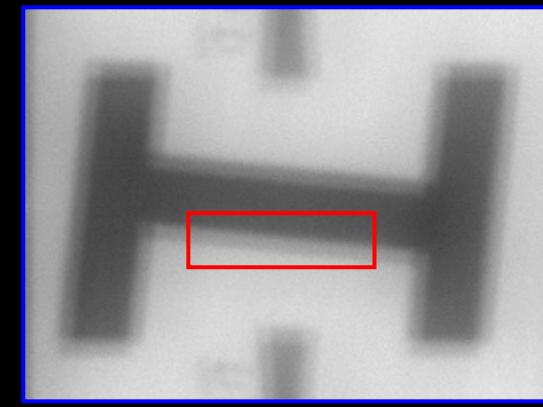
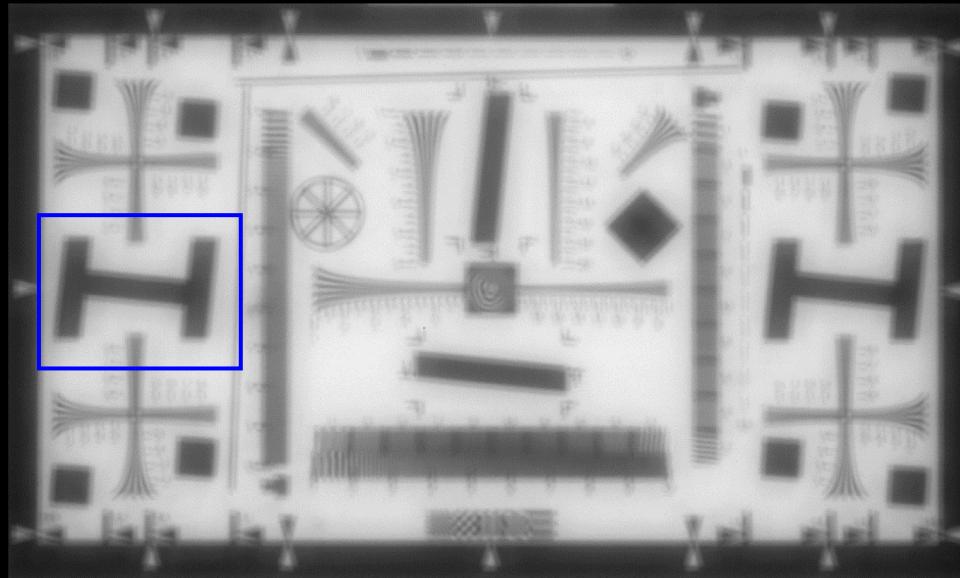


Figure 10

(b) Spatial resolution

Before recon.



After recon.

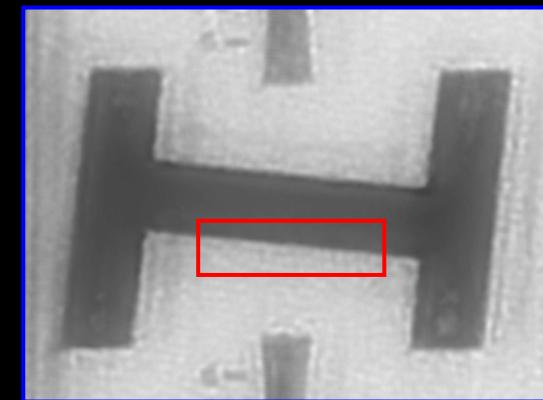
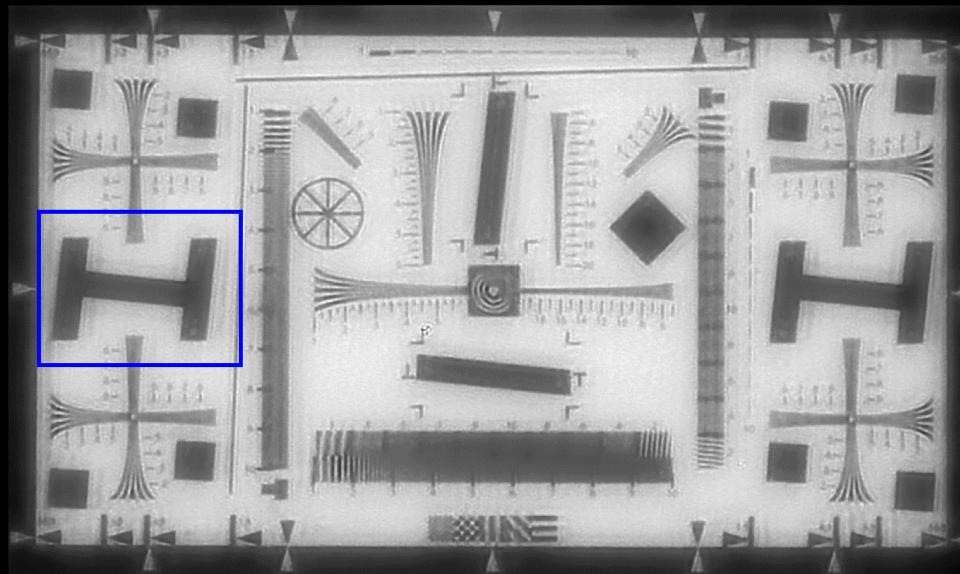
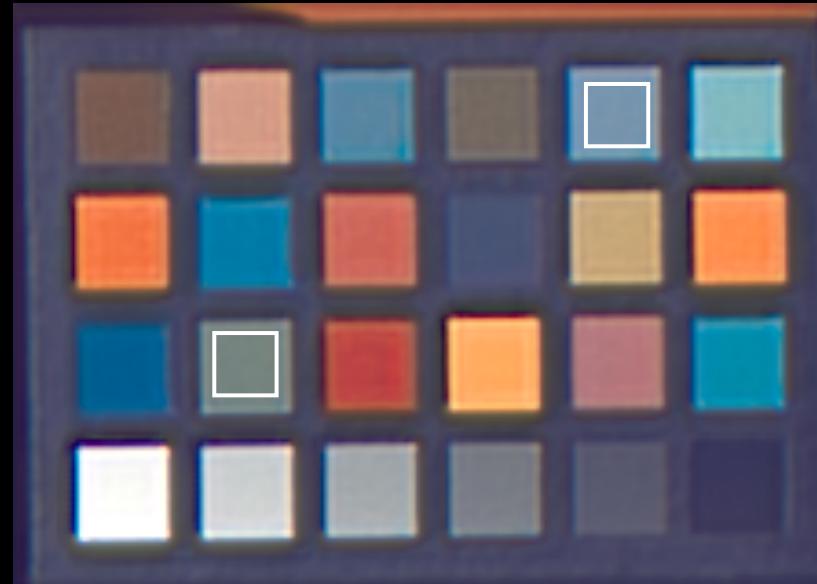


Figure 11

Ground truth (PSNR)



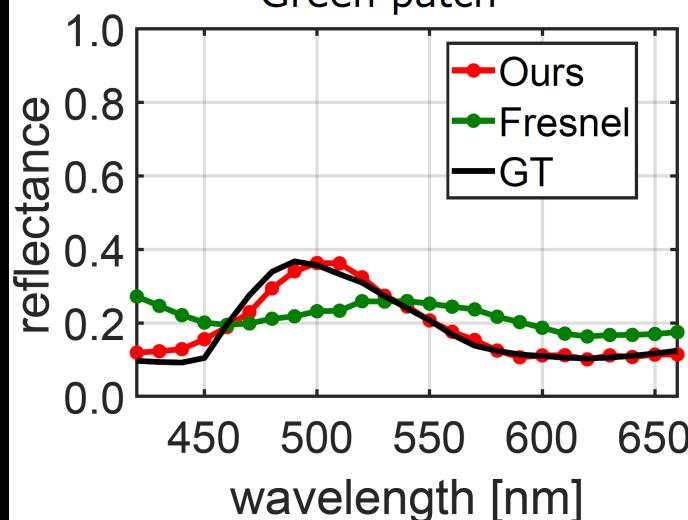
Fresnel (22.26dB)



Ours (30.25dB)



Green patch



Light violet patch

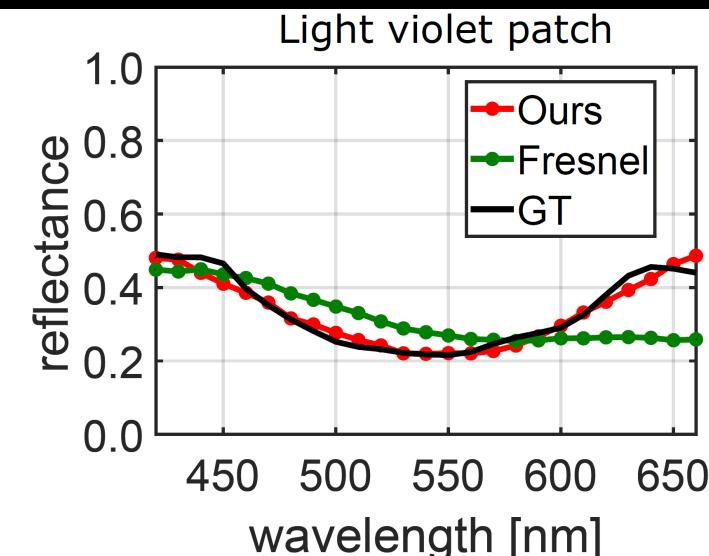


Figure 12

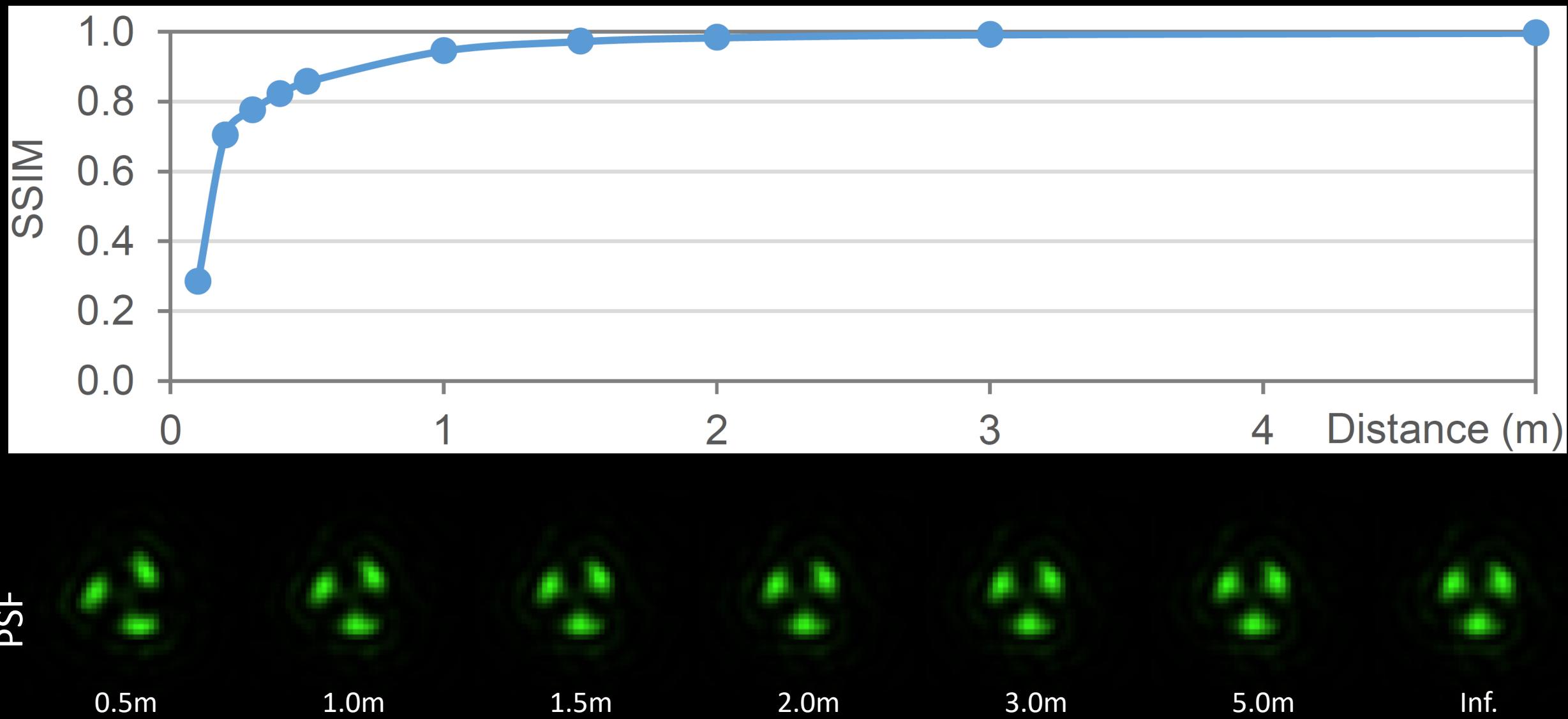
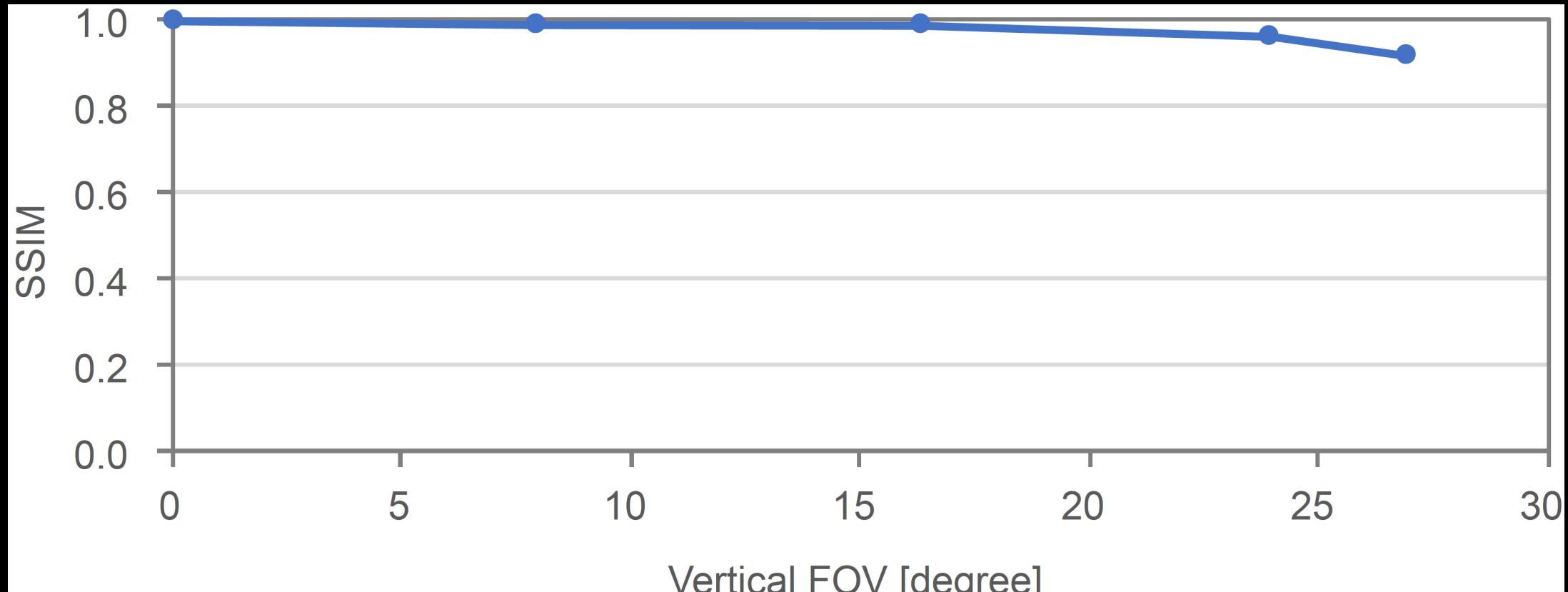


Figure 13



PSF



0 deg



8 deg



16 deg

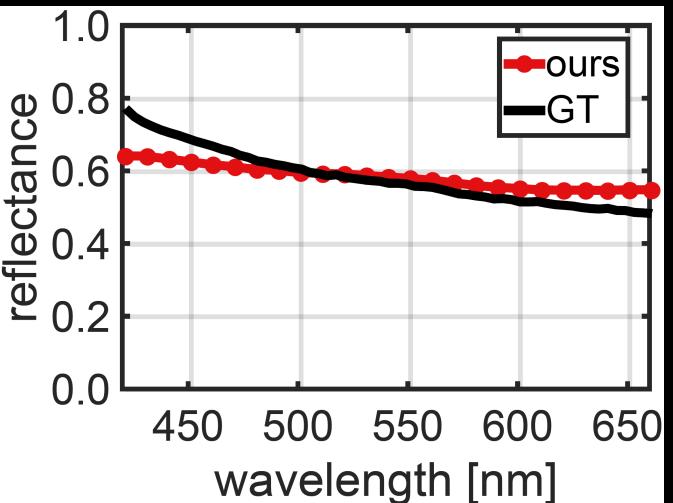


24 deg

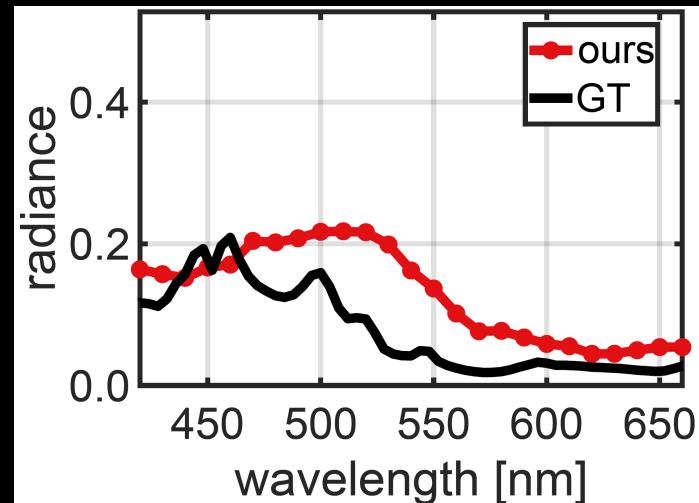
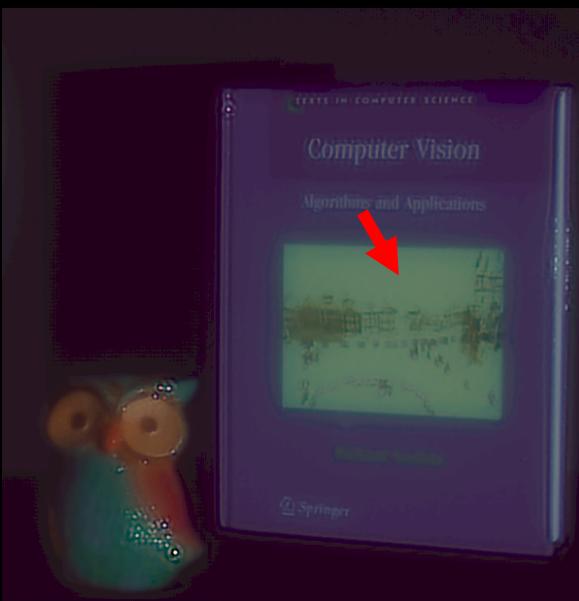


27 deg

Figure 14



(a) Lack of edges



(b) High-frequency illumination

Synthetic and Real Results of Color Checker

