

Computer Science E-7

Exposing Digital Photography

Lecture 12: Artifacts
November 30, 2009

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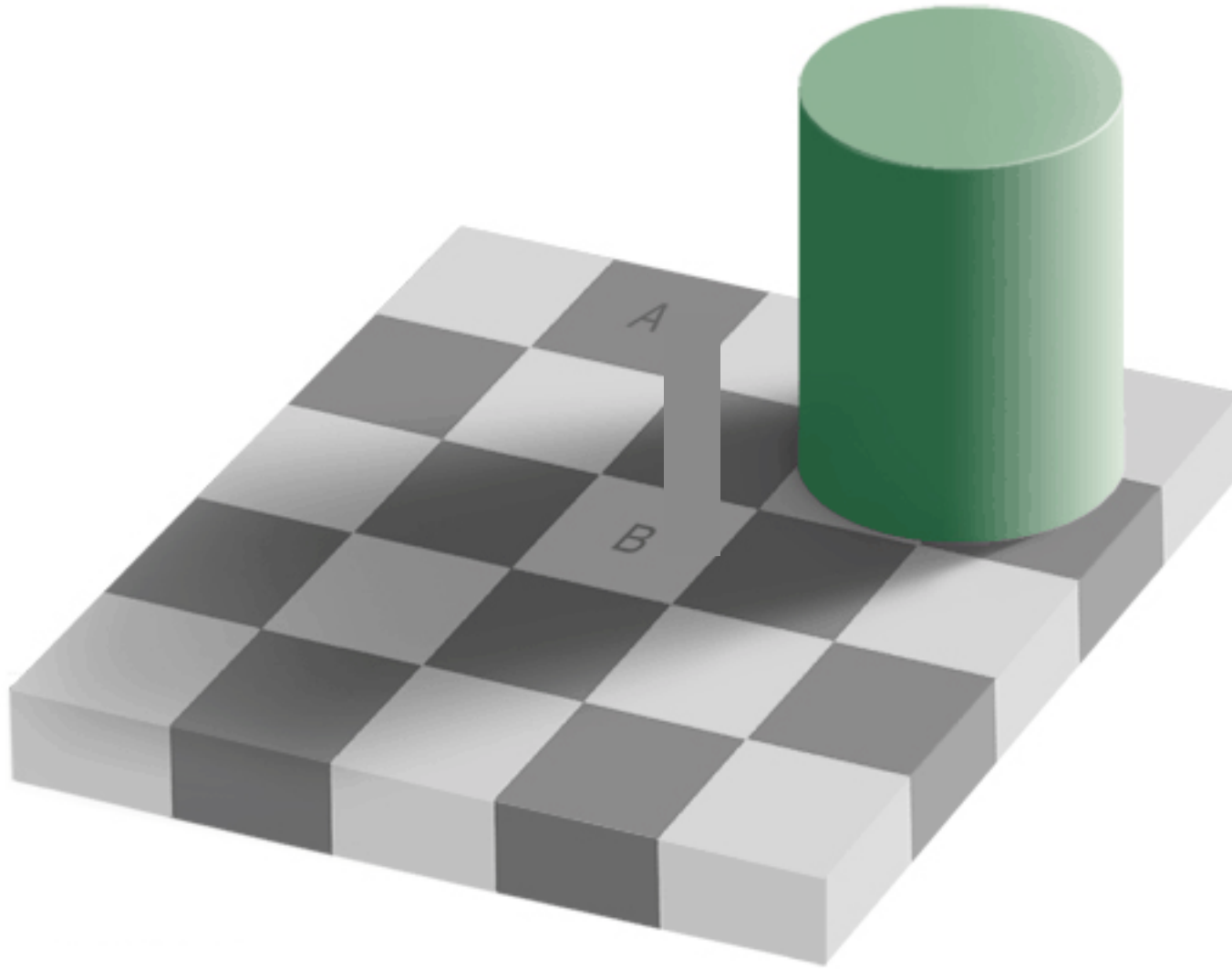


Image from http://en.wikipedia.org/wiki/Visible_spectrum

Review

The Eye

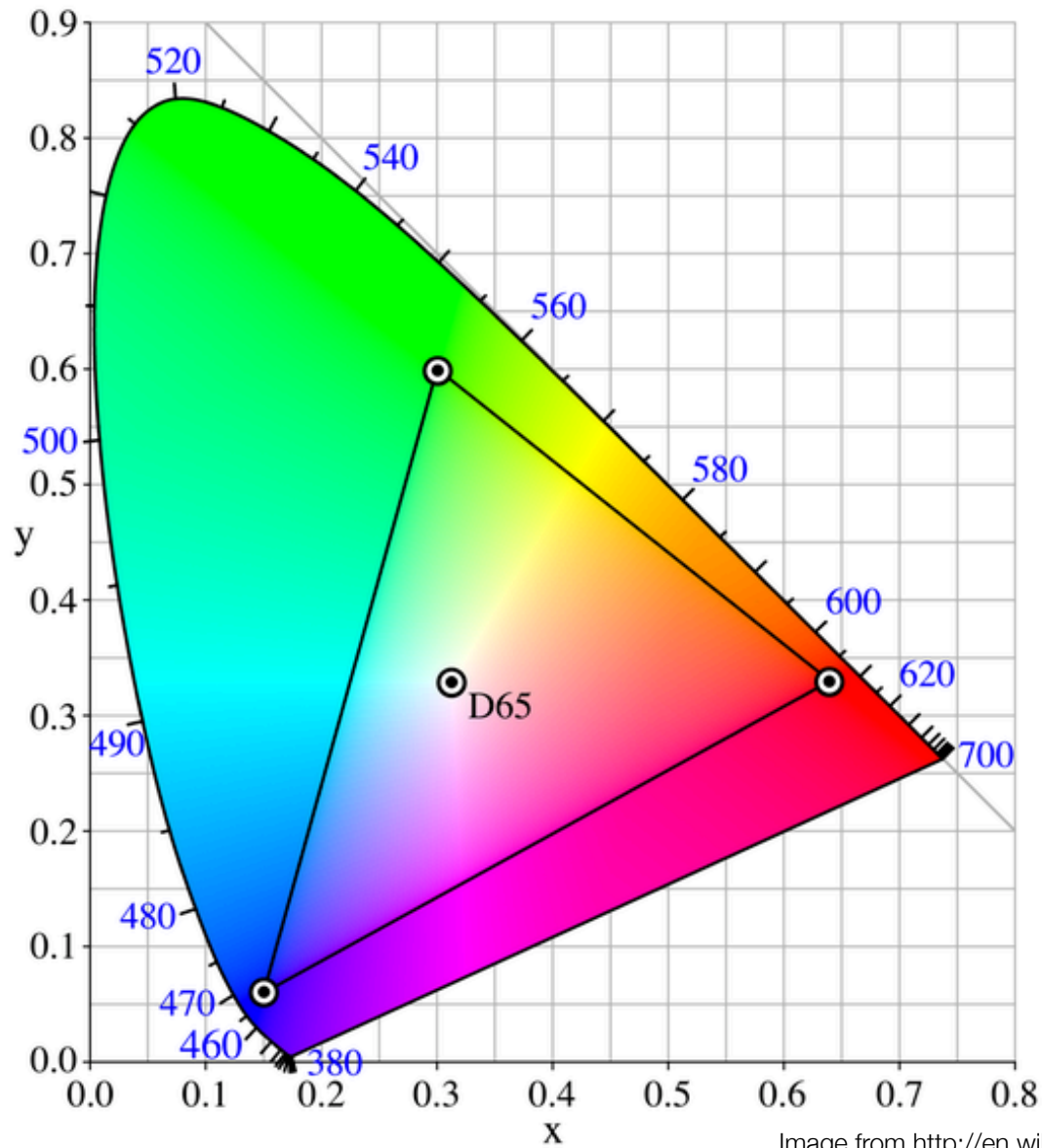


Image from http://en.wikipedia.org/wiki/SRGB_color_space

Review

sRGB

Gamut mapping

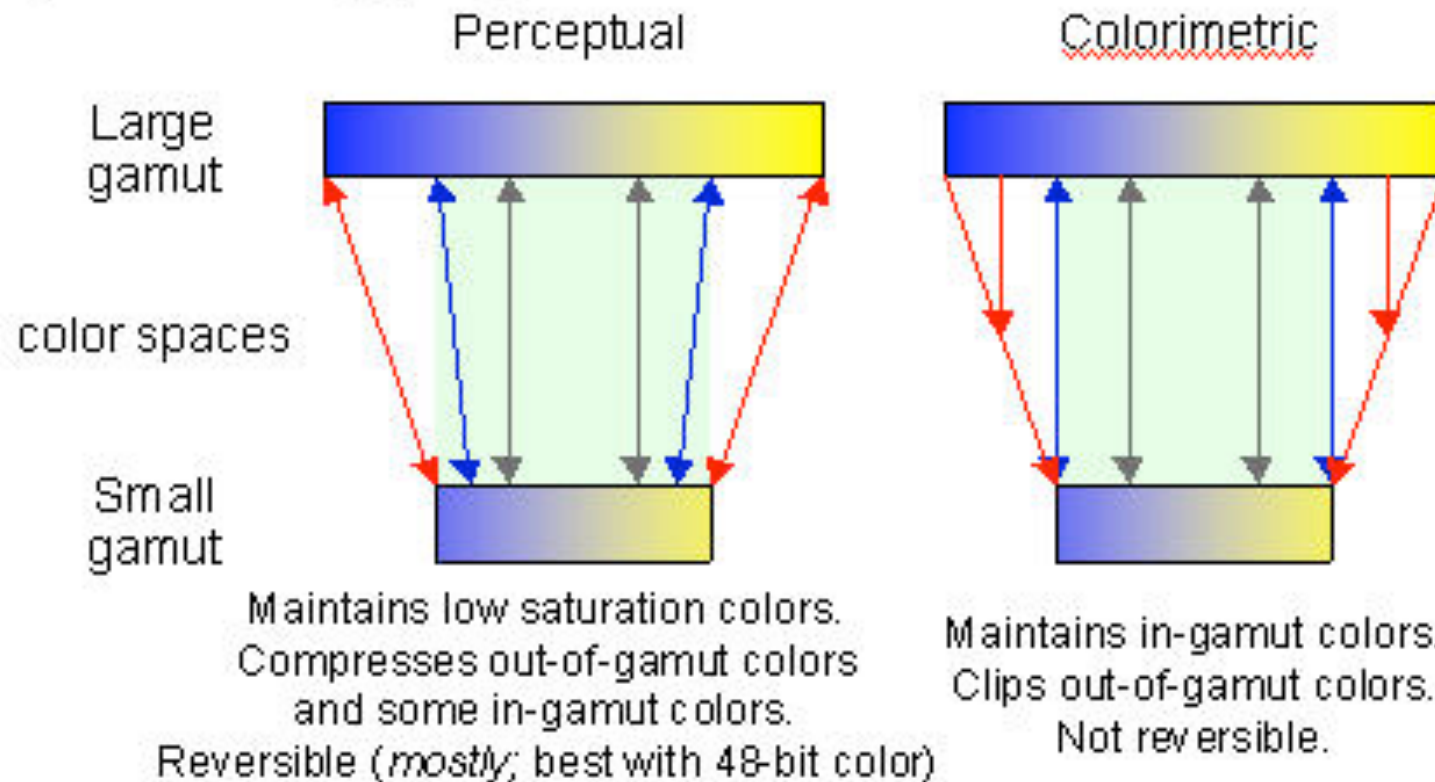


Image from http://www.normankoren.com/color_management.html

Review

Color Mgmt Gamut Mapping

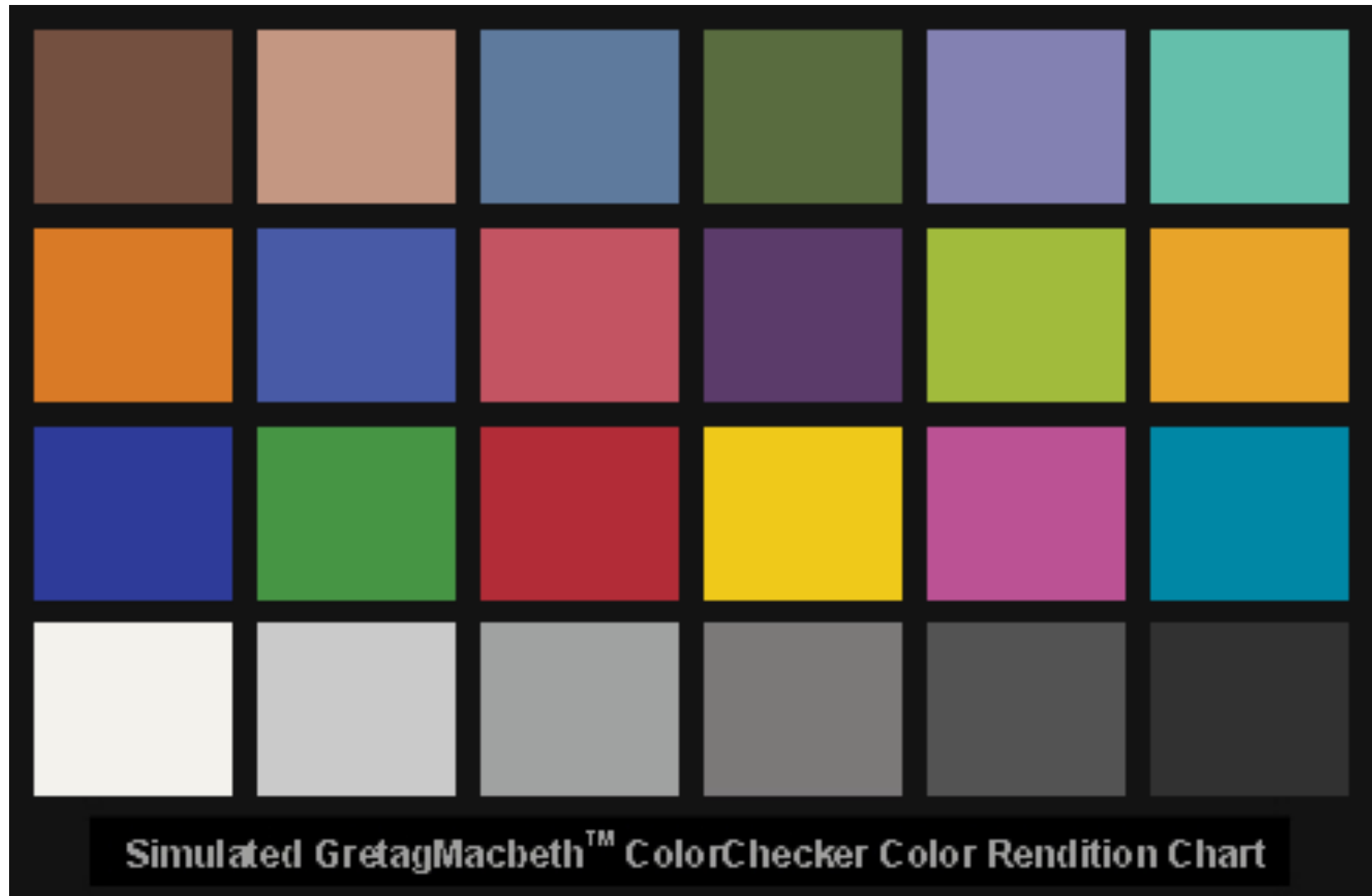


Image from http://www.normankoren.com/color_management_2A.html

Review

Monitor Profiling

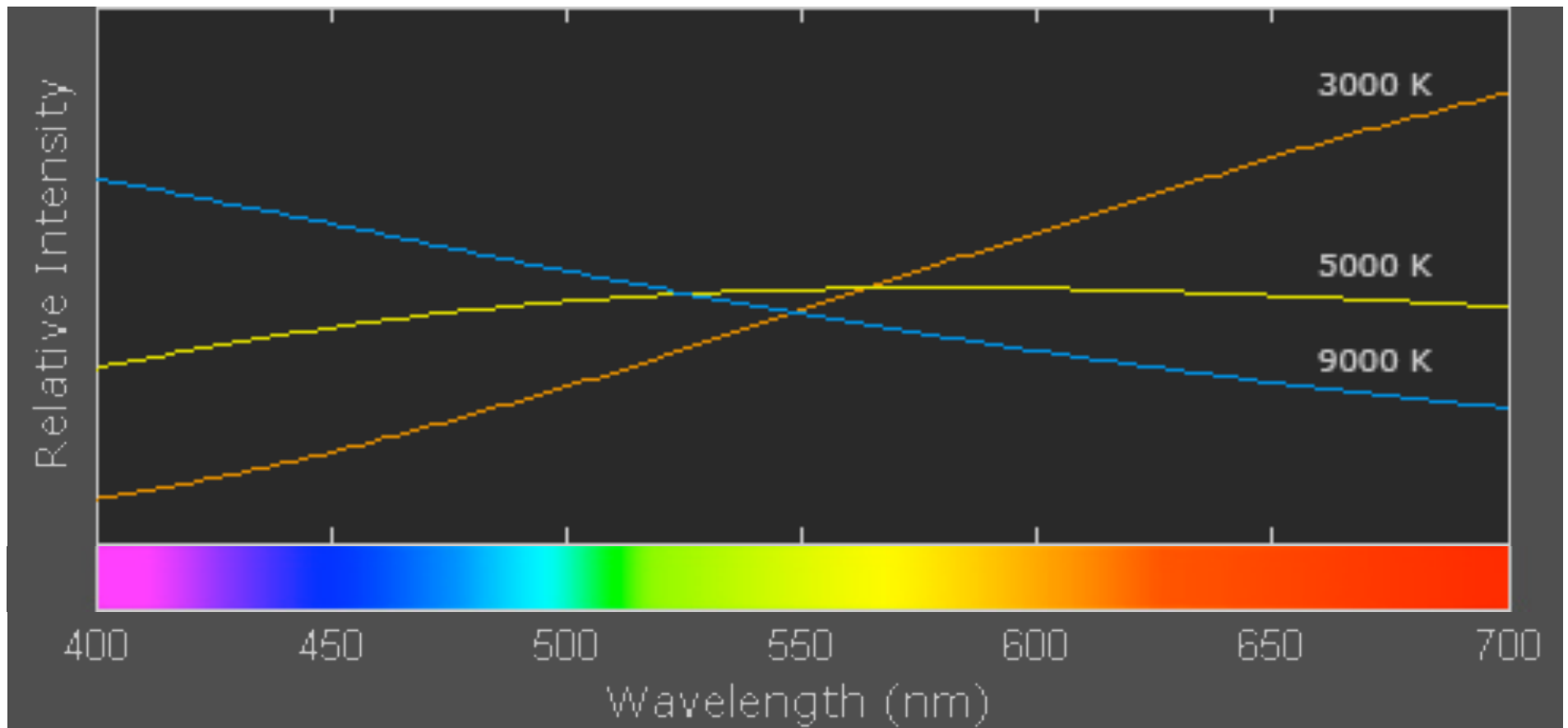


Image from <http://www.cambridgeincolour.com/tutorials/white-balance.htm>

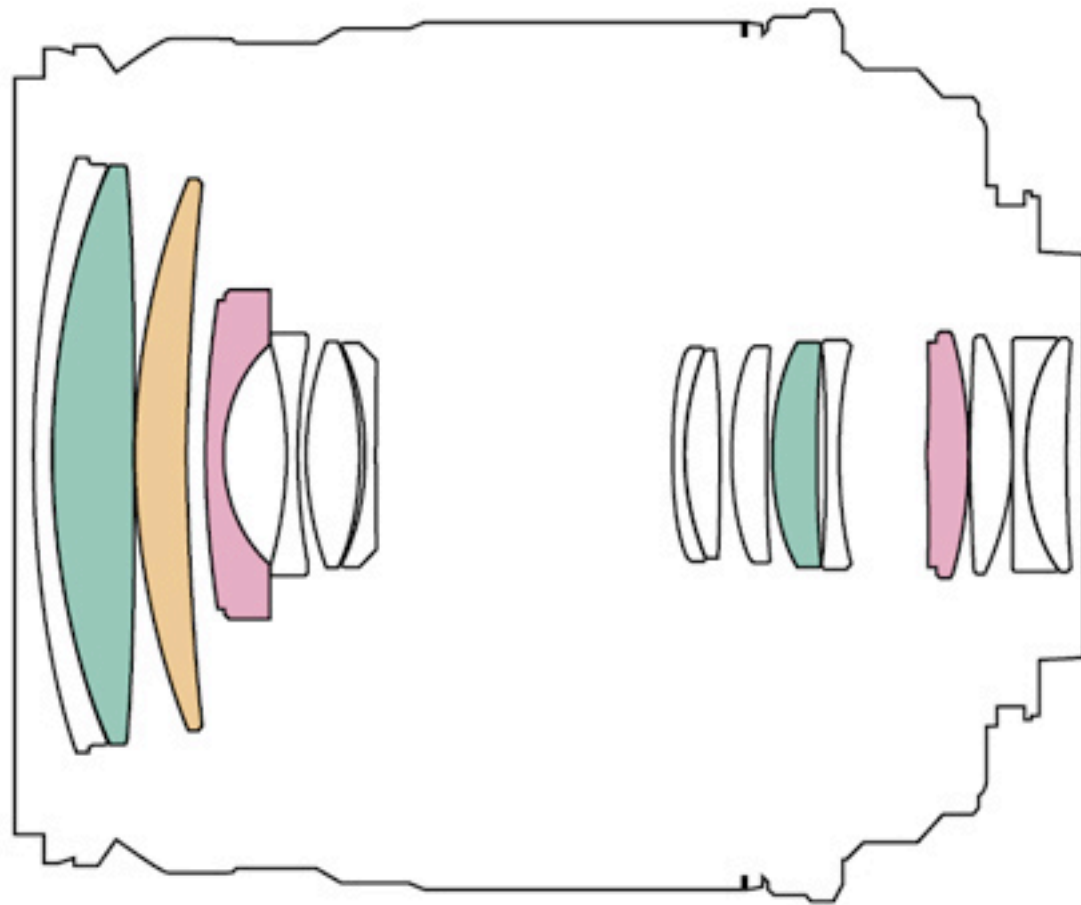
Review

White Balance

| | RAW | JPEG |
|------------------------|------------------|-------------|
| Bit depth | 10-, 12-, 14-bit | 8-bit |
| Tonal Curve | Not applied | Applied |
| White Balance | Not set | Set |
| Compression | Lossless | Lossy |
| Portability | Nonstandard | Standard |
| Post-Processing | Required | Optional |

Review

RAW vs JPEG!



Artifacts

Optical Aberrations

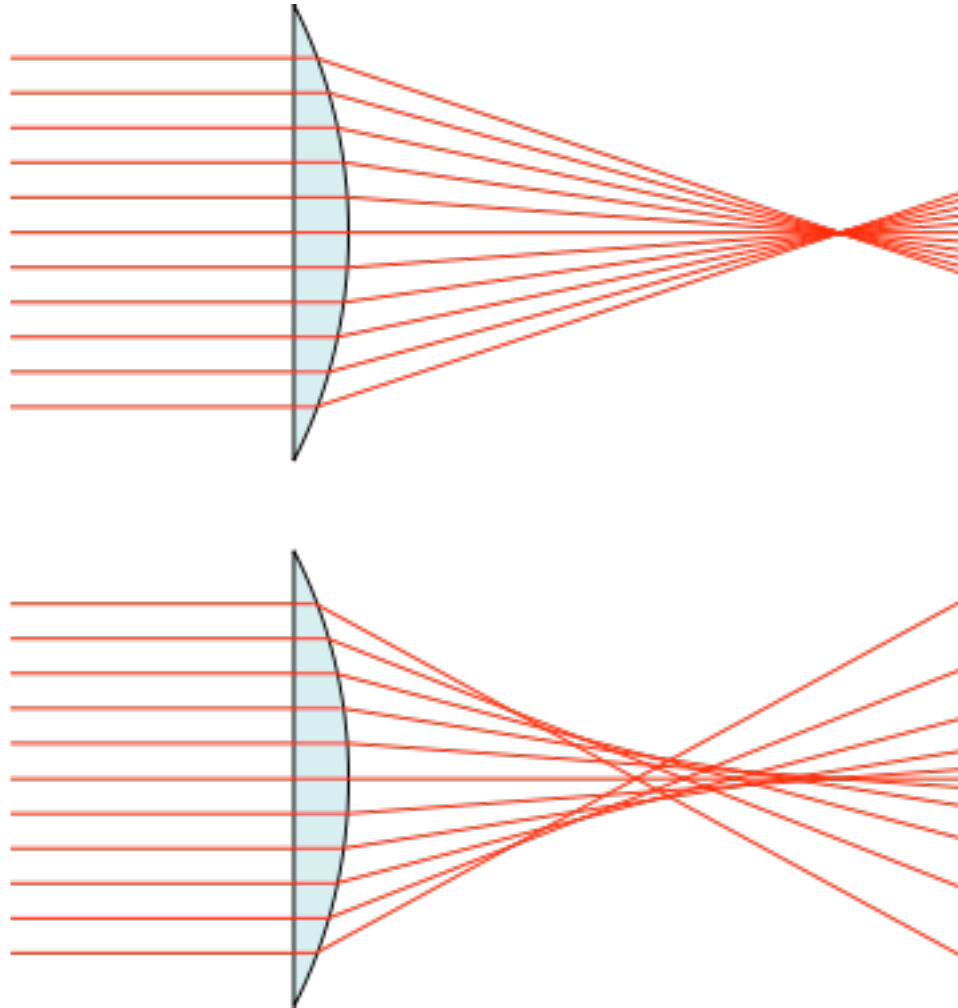


Image from http://en.wikipedia.org/wiki/Spherical_aberration

Optical Aberrations

Spherical Aberration

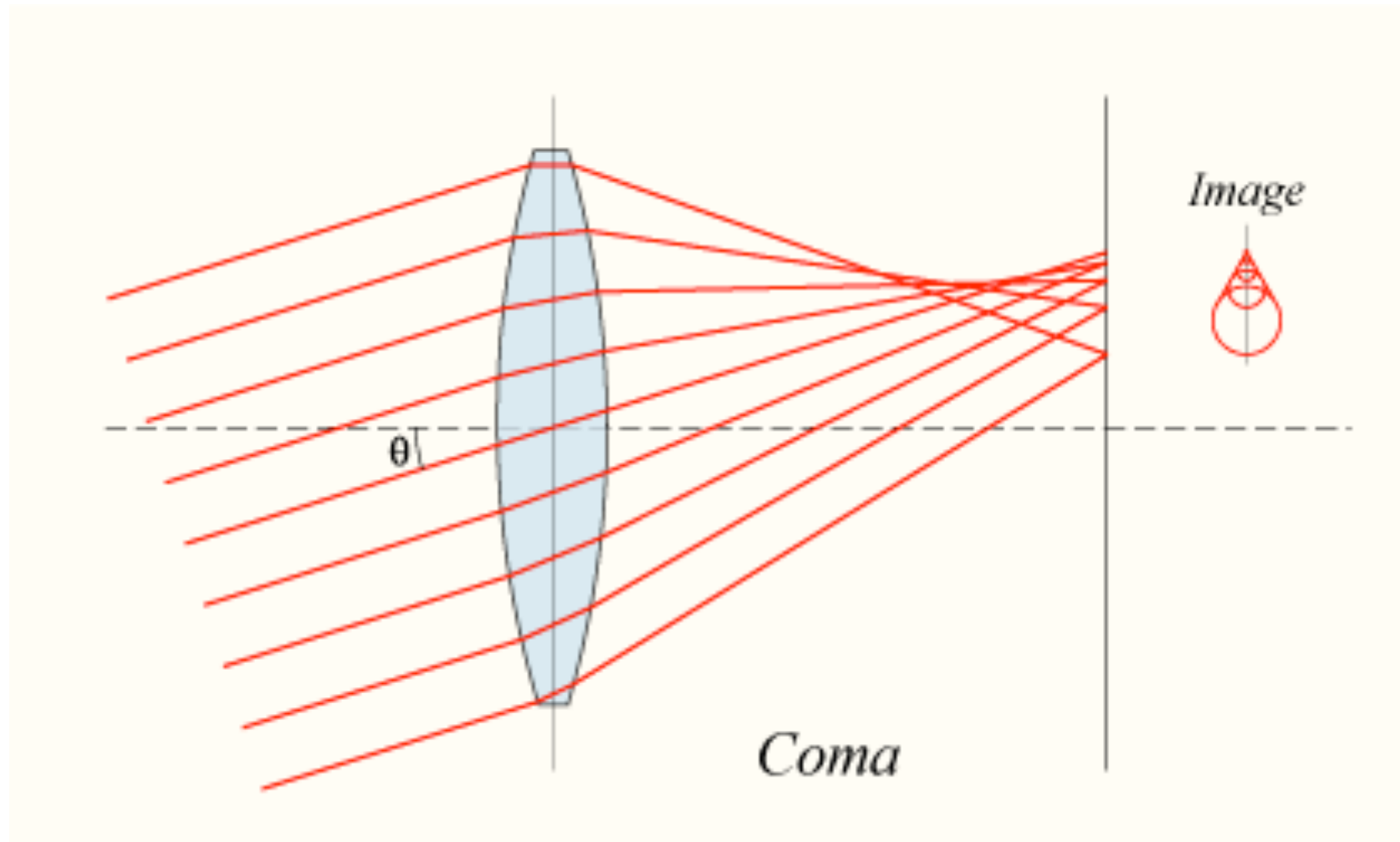


Image from http://en.wikipedia.org/wiki/Coma_%28optics%29

Optical Aberrations

Coma

Off-Axis Comatic Aberration

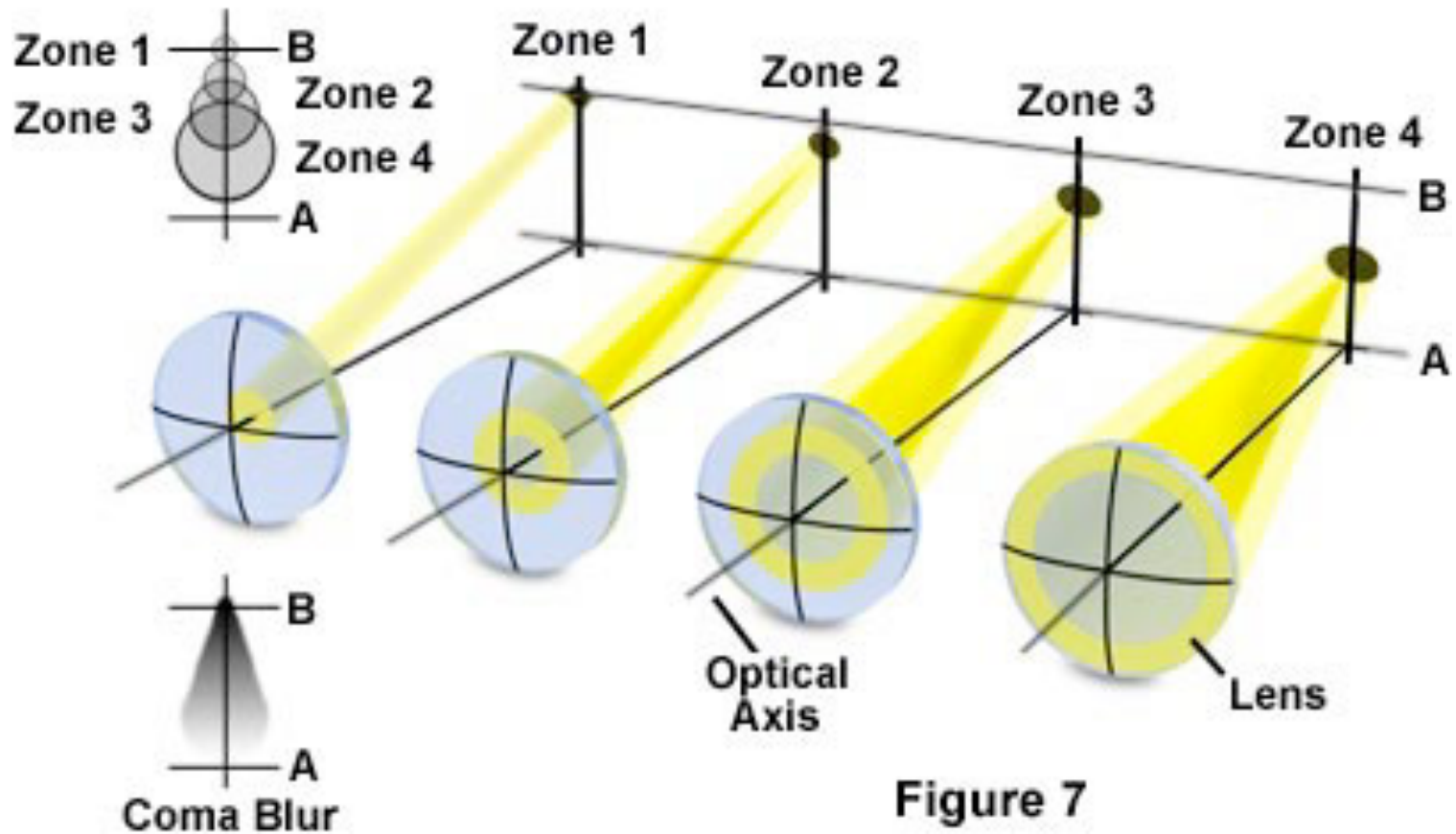


Figure 7

Image from <http://www.olympusmicro.com/primer/anatomy/aberrations.html>

Optical Aberrations

Coma

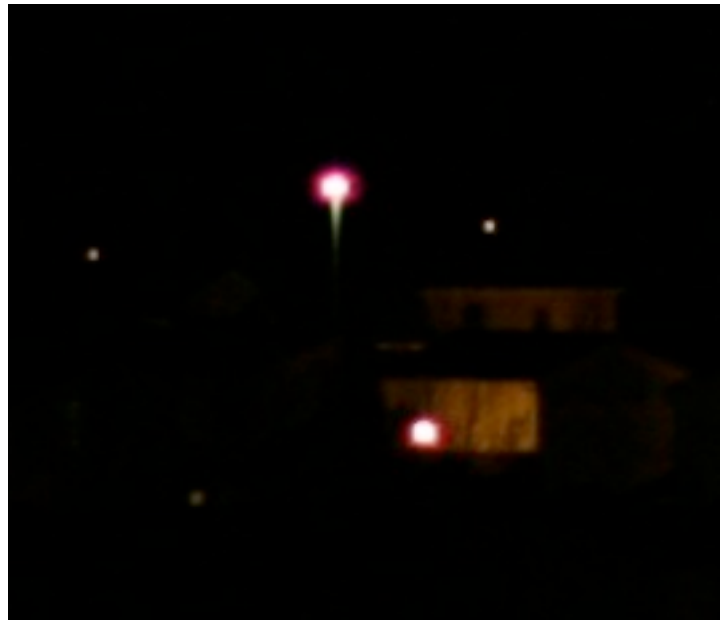
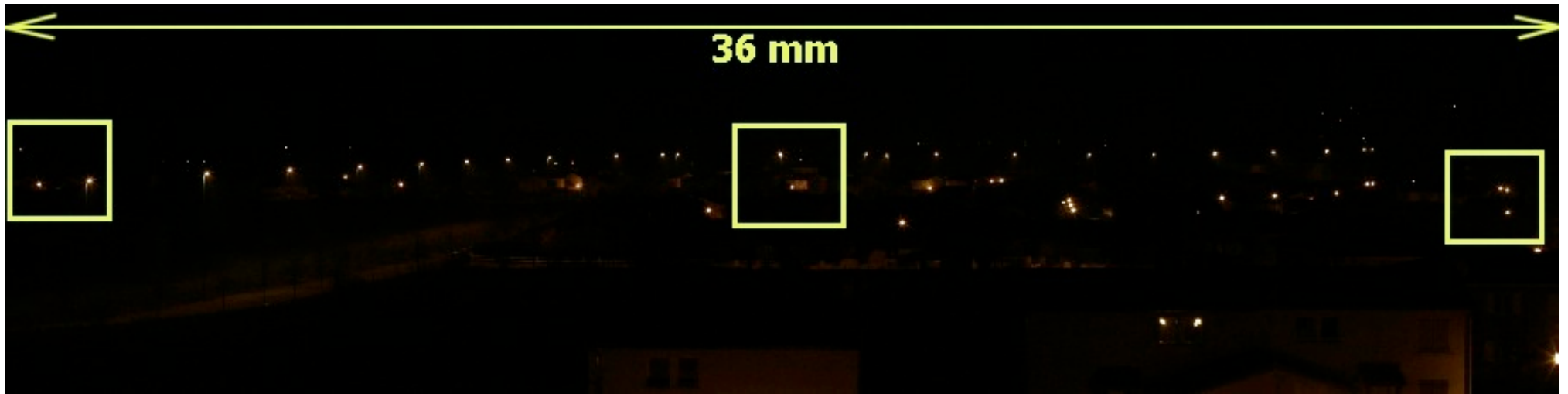


Image from http://www.astrosurf.com/buil/50mm/test_us.htm

Optical Aberrations

Coma

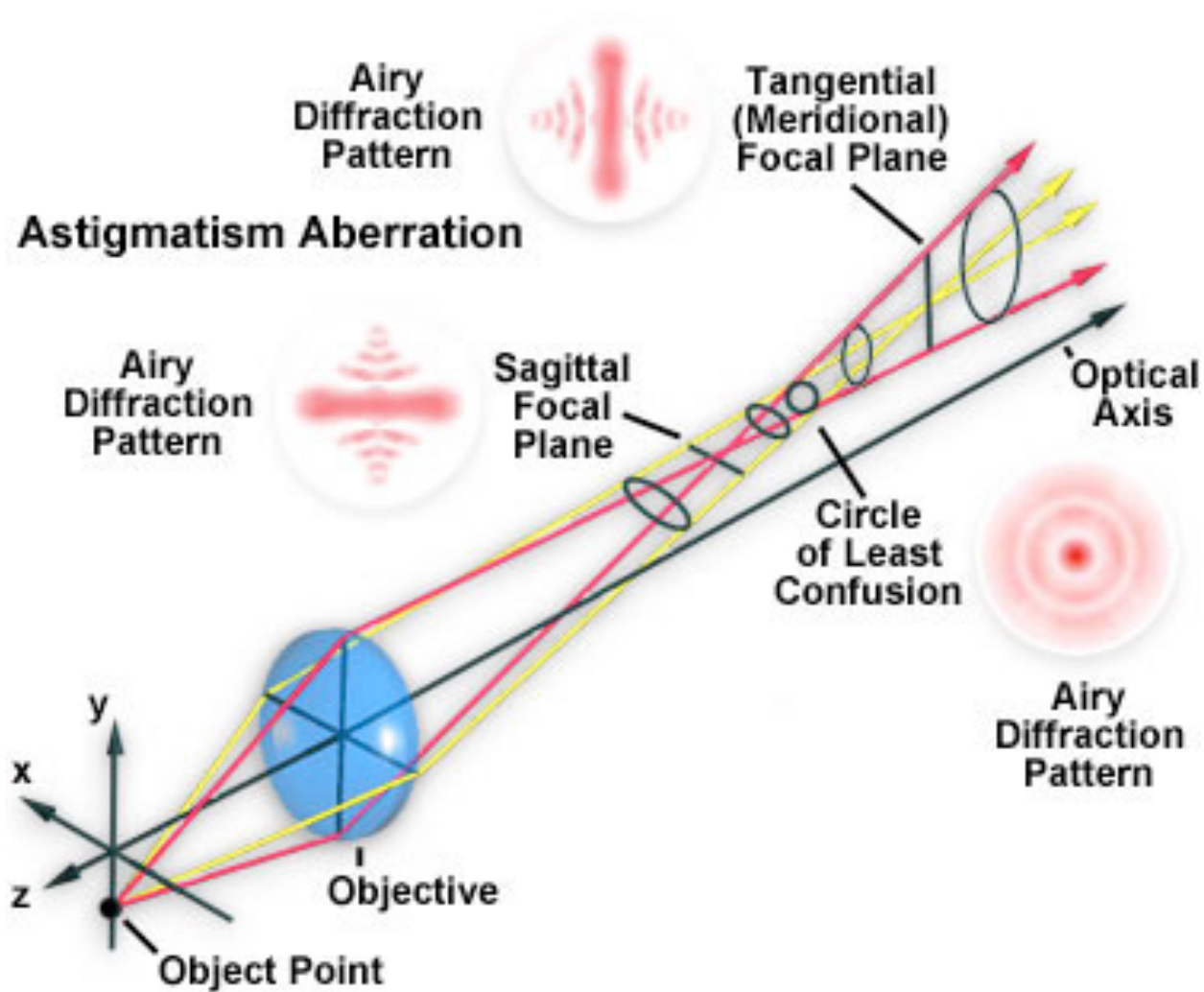


Image from <http://www.olympusmicro.com/primer/anatomy/aberrations.html>

Optical Aberrations

Astigmatism



Image from <http://www.vanwalree.com/optics/vignetting.html>

Optical Aberrations

Vignette



Image from <http://www.vanwalree.com/optics/vignetting.html>

Optical Aberrations

Vignette

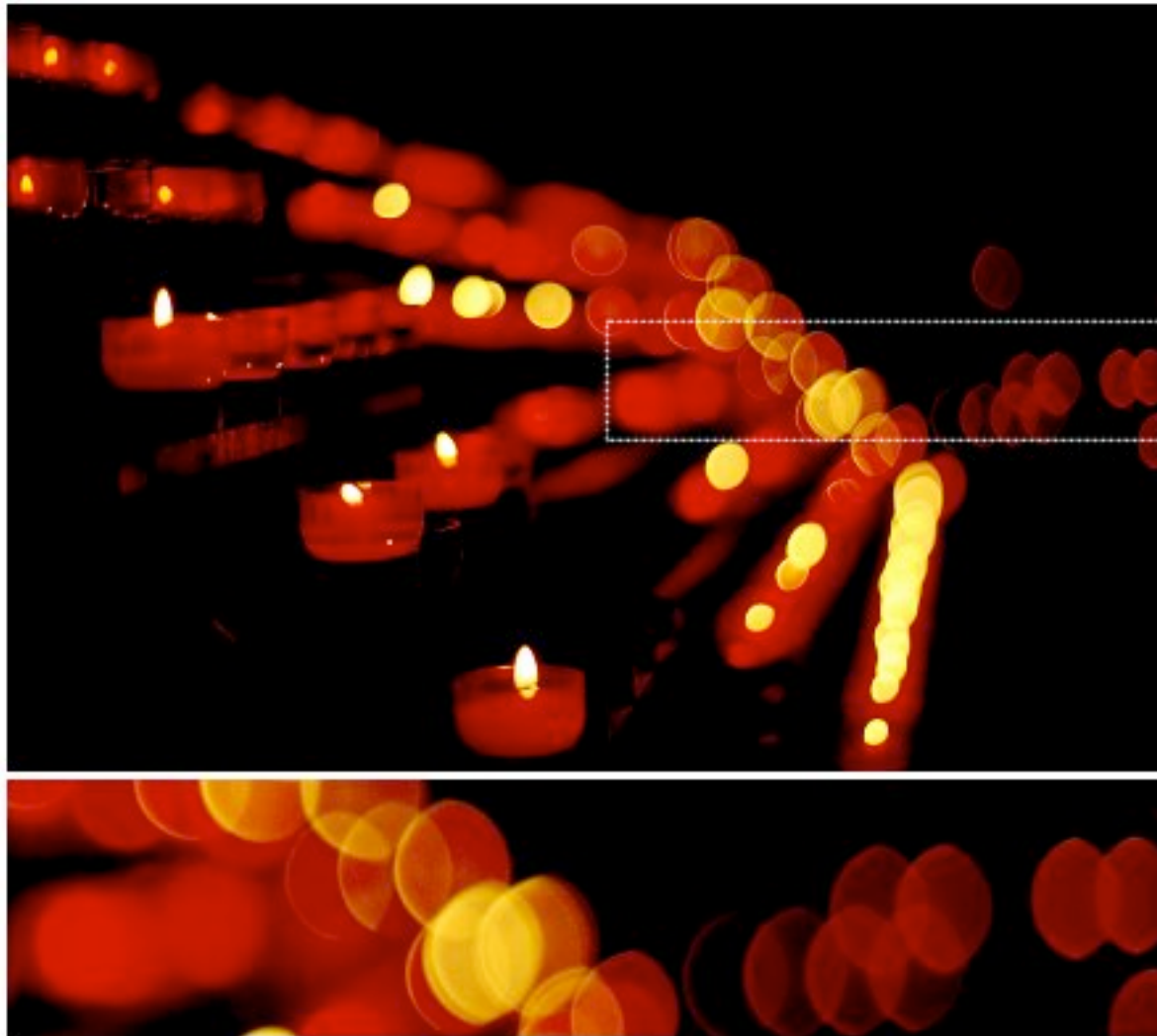


Image from <http://www.vanwalree.com/optics/vignetting.html>

Optical Aberrations

Optical Vignette

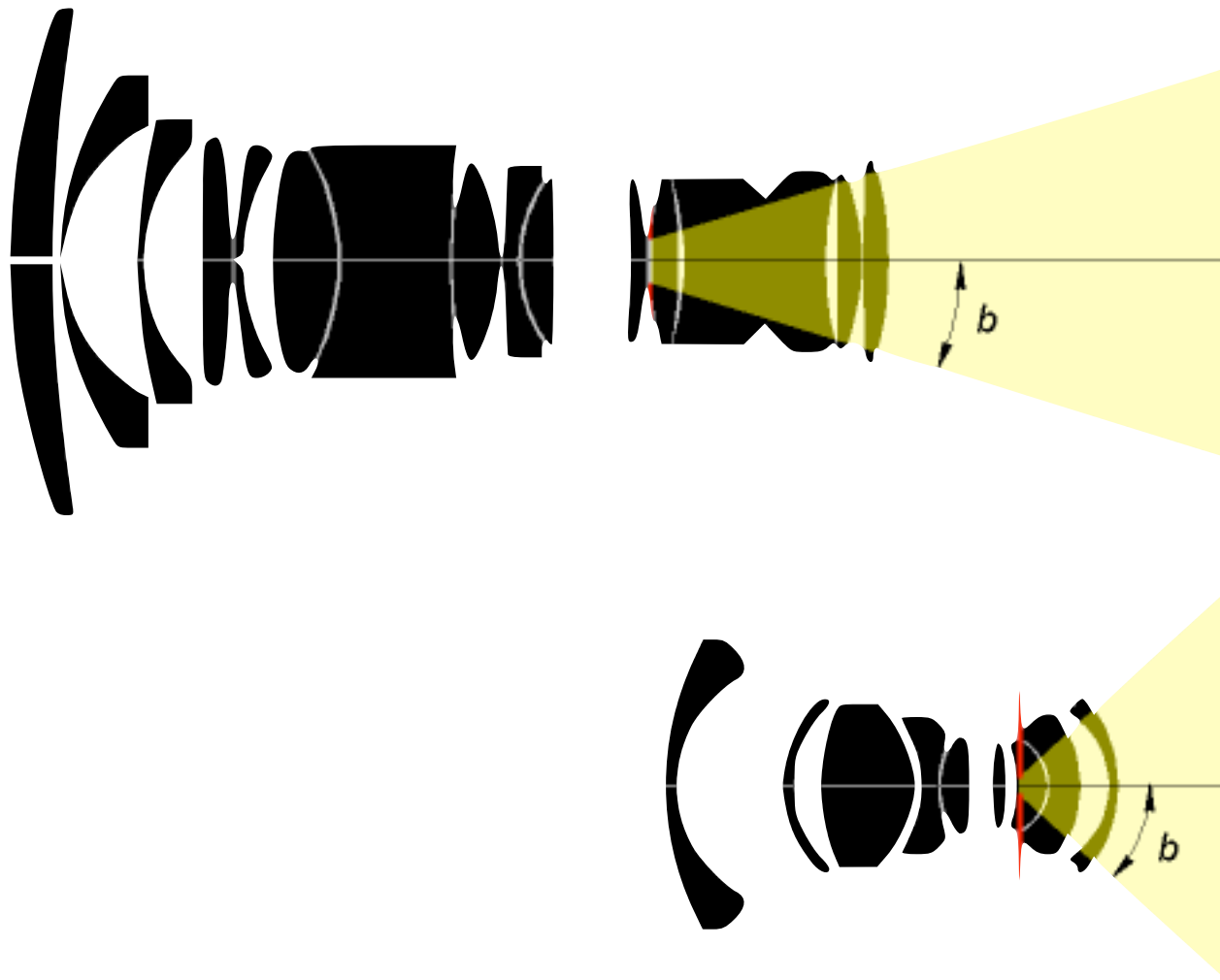


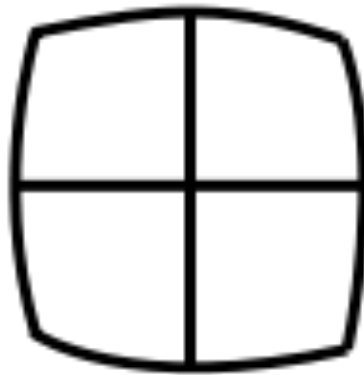
Image from <http://www.vanwalree.com/optics/vignetting.html>

Optical Aberrations

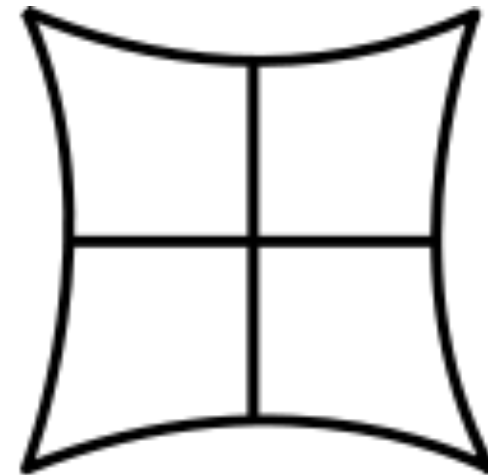
Natural Vignette



Object



Barrel shaped



Cushion shaped

Distorted image

Image from <http://www.vanwalree.com/optics/vignetting.html>

Optical Aberrations

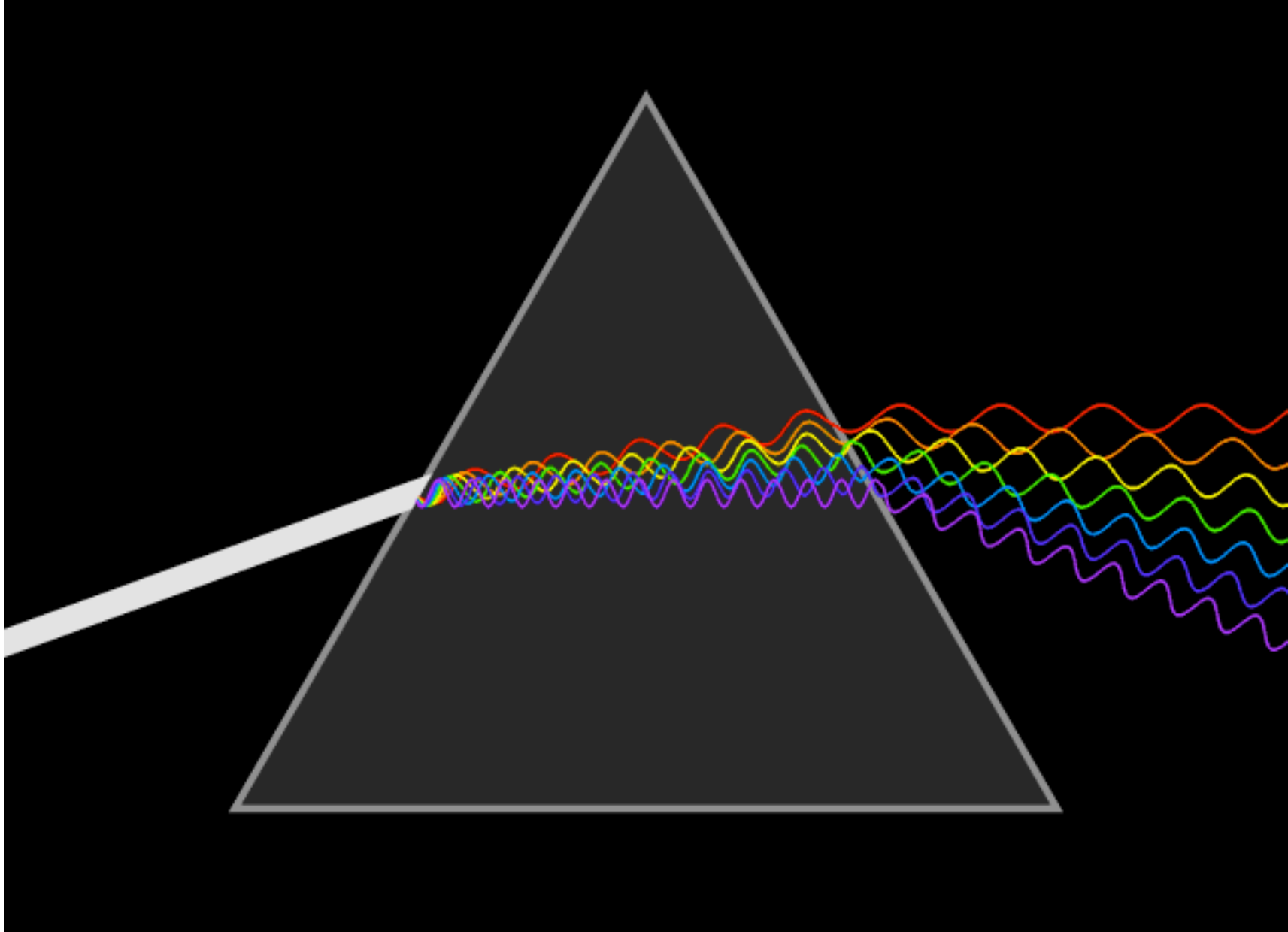
Distortions



Images from <http://www.dpreview.com/learn/?/Glossary/>

Optical Aberrations

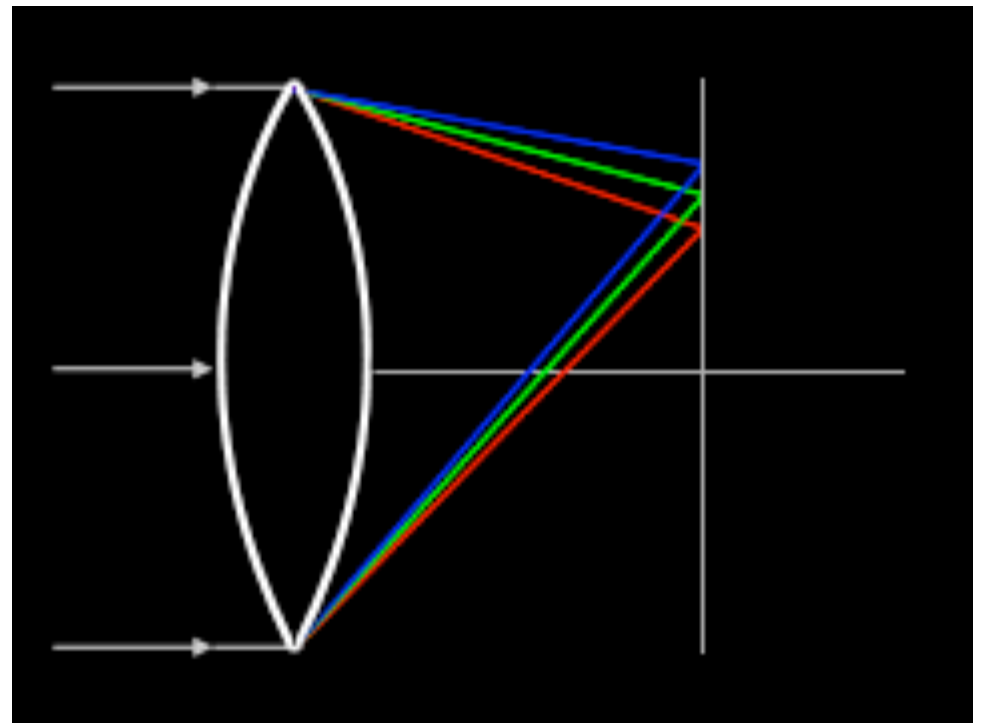
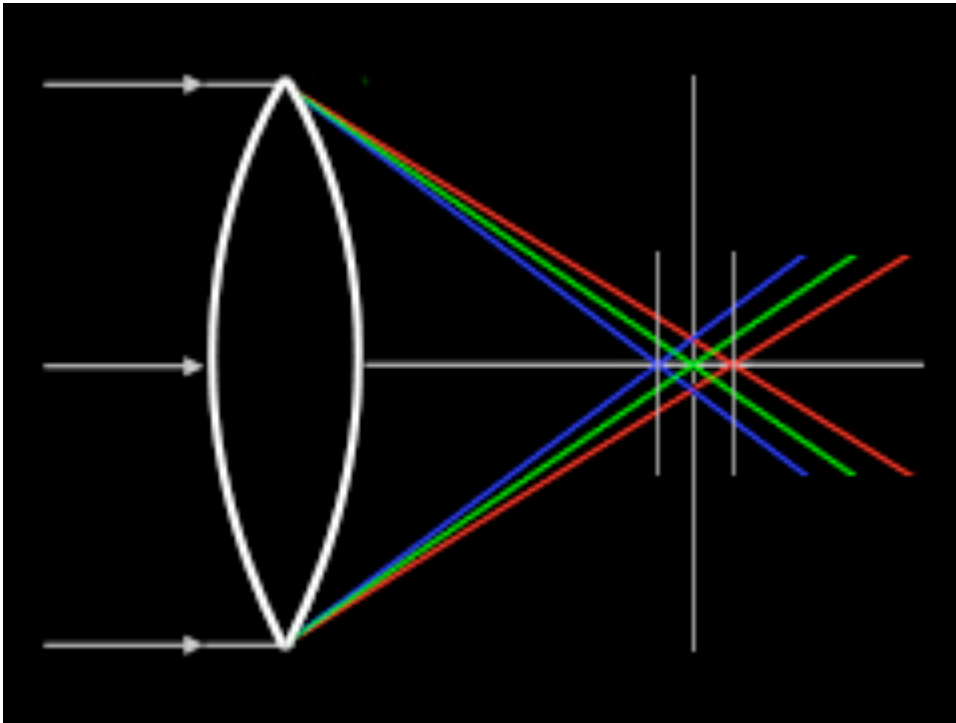
Distortions



Animation from http://en.wikipedia.org/wiki/Prism_%28optics%29

Optical Artifacts

Refraction



Images from http://www.dpreview.com/learn/?/Glossary/Optical/chromatic_aberration_01.htm

Aberrations

Chromatic



Images from http://en.wikipedia.org/wiki/Chromatic_aberration

Aberrations

Chromatic



Image from http://en.wikipedia.org/wiki/Chromatic_aberration

Chromatic Aberrations

Fringing

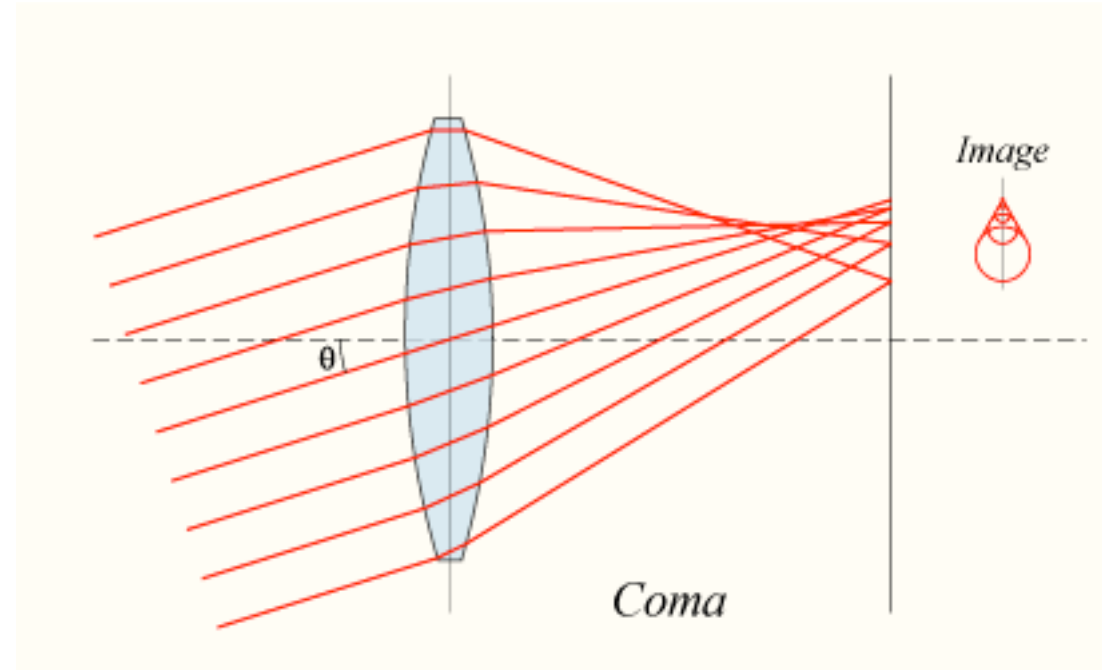
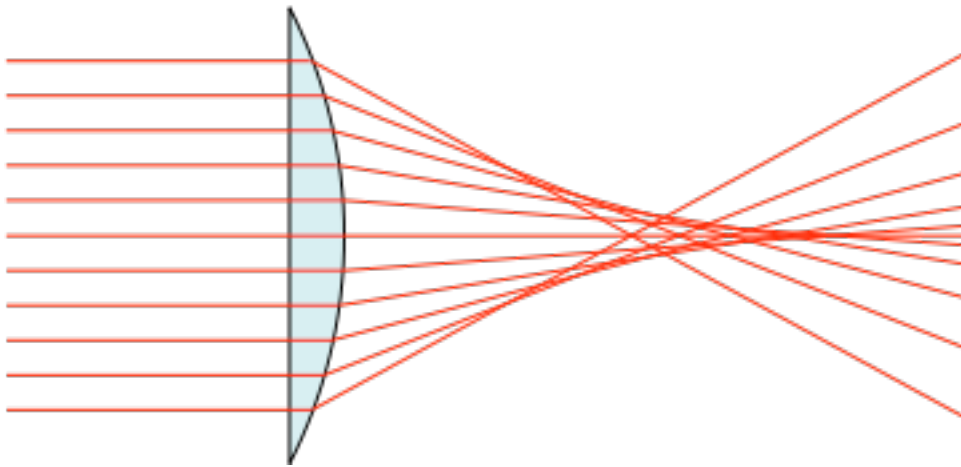


Image from http://en.wikipedia.org/wiki/Spherical_aberration

Optical Aberrations

Correcting?

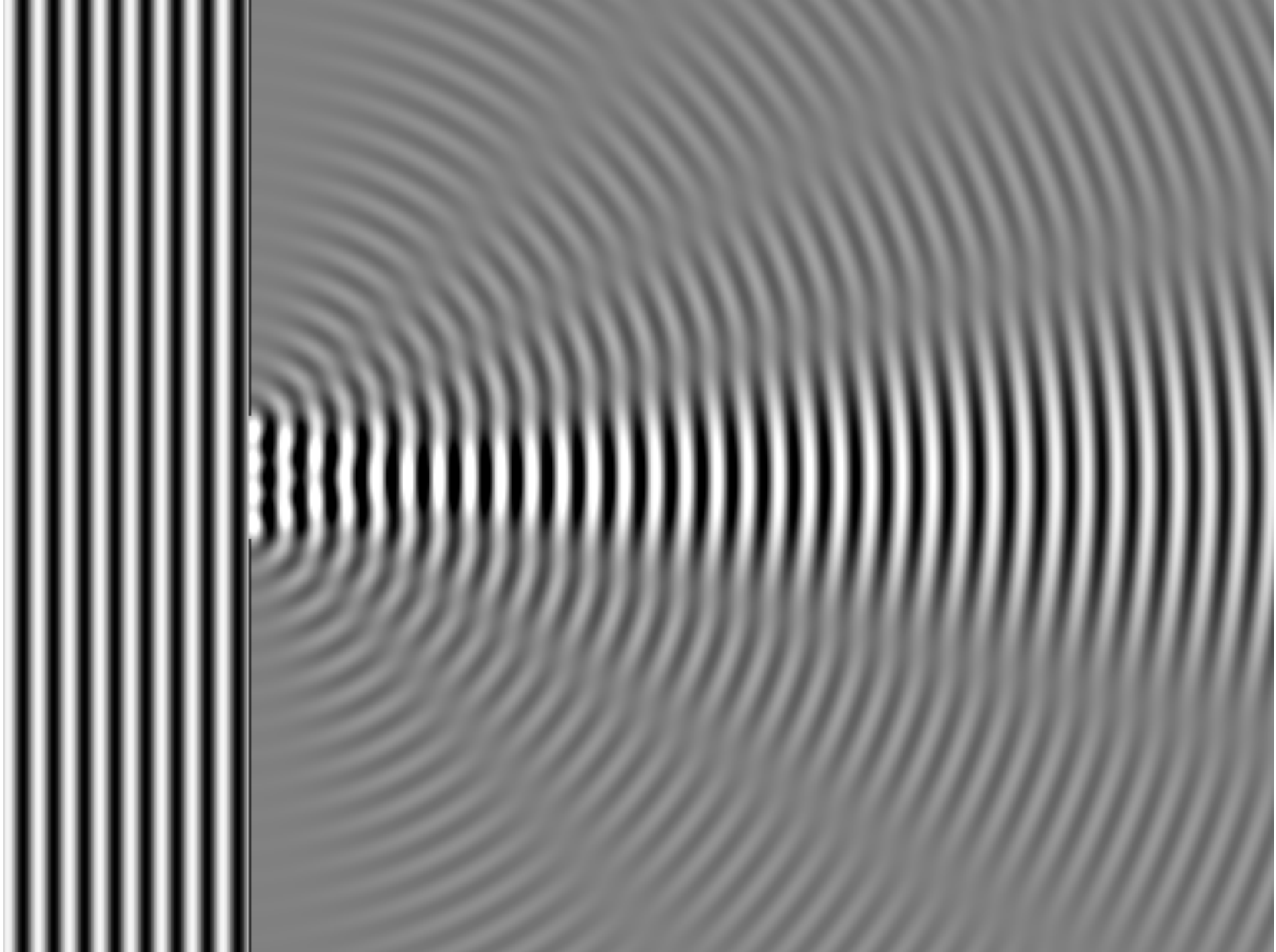


Image from <http://en.wikipedia.org/wiki/Diffraction>

Optical Artifacts

Diffraction

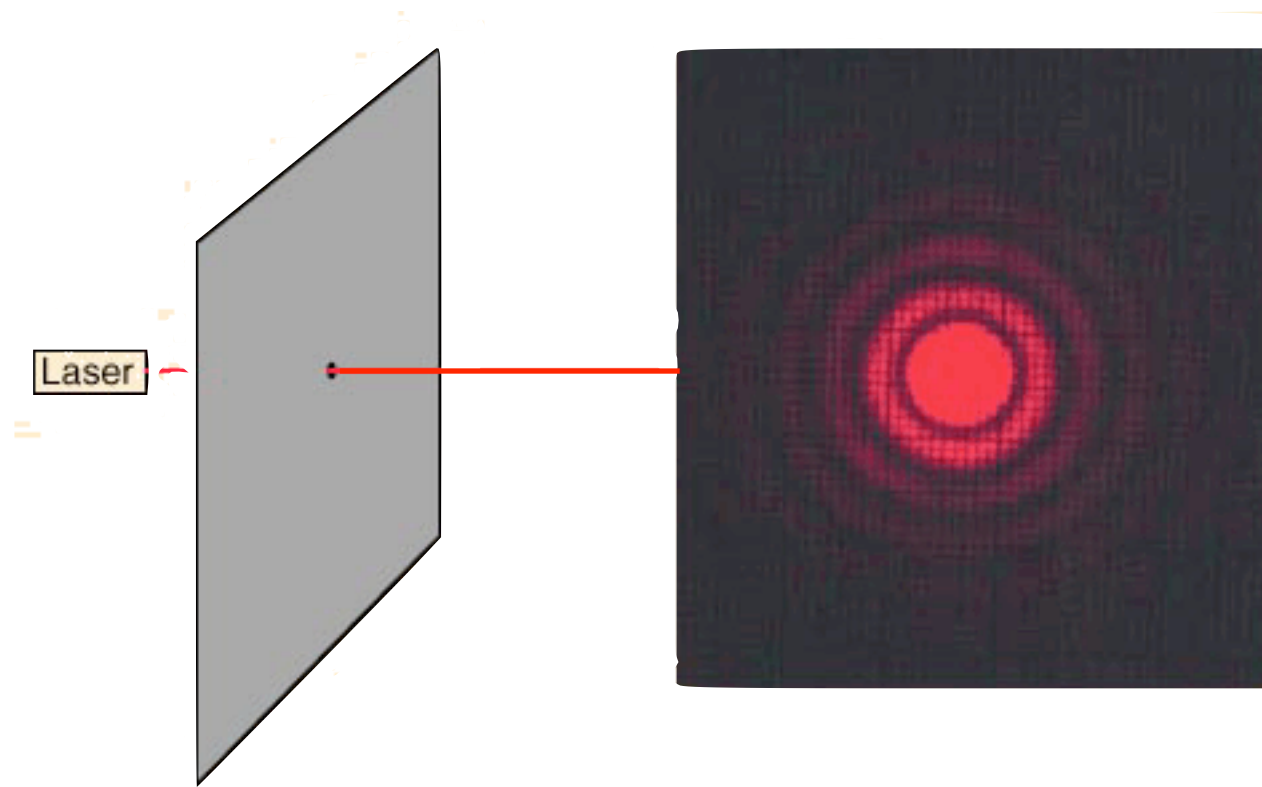


Image from <http://en.wikipedia.org/wiki/Diffraction>

Optical Artifacts

Diffraction



f/5.6



f/45

Image from <http://www.luminous-landscape.com/tutorials/understanding-series/u-diffraction.shtml>

Optical Artifacts

Diffraction

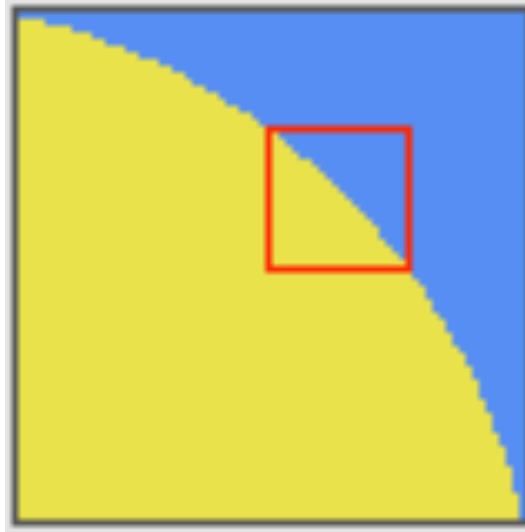


Image from Digital Photography Review, <http://www.dpreview.com>

Artifacts

Digital

Alias



Anti-Aliased

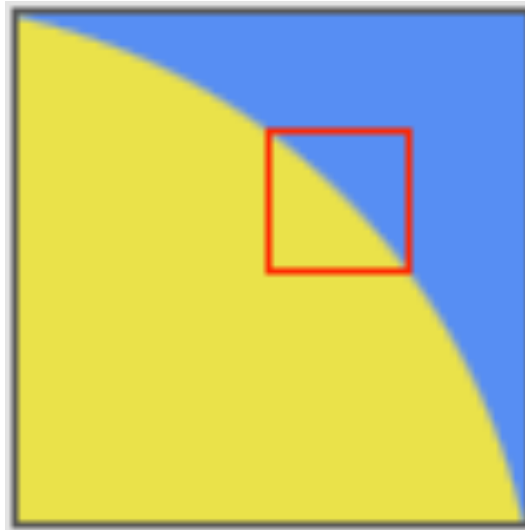


Image from http://www.dpreview.com/learn/?/Glossary/Digital_Imaging/Aliasing_01.htm

Digital Artifacts

Aliasing

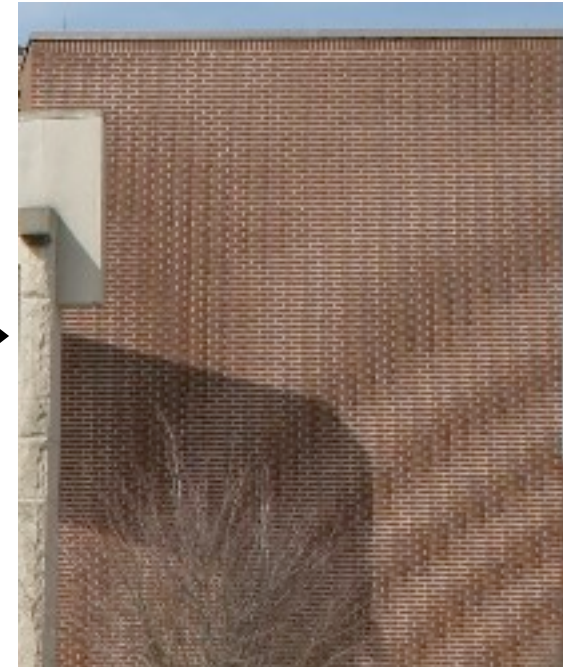
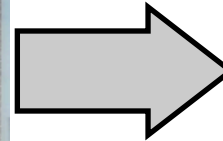


Image from http://en.wikipedia.org/wiki/Moiré_pattern

Digital Artifacts

Moiré



Images from <http://www.ddisoftware.com/reviews/sd9-v-bayer/> and http://www.dpreview.com/learn/?/Glossary/Digital_Imaging/Moire_01.htm

Digital Artifacts

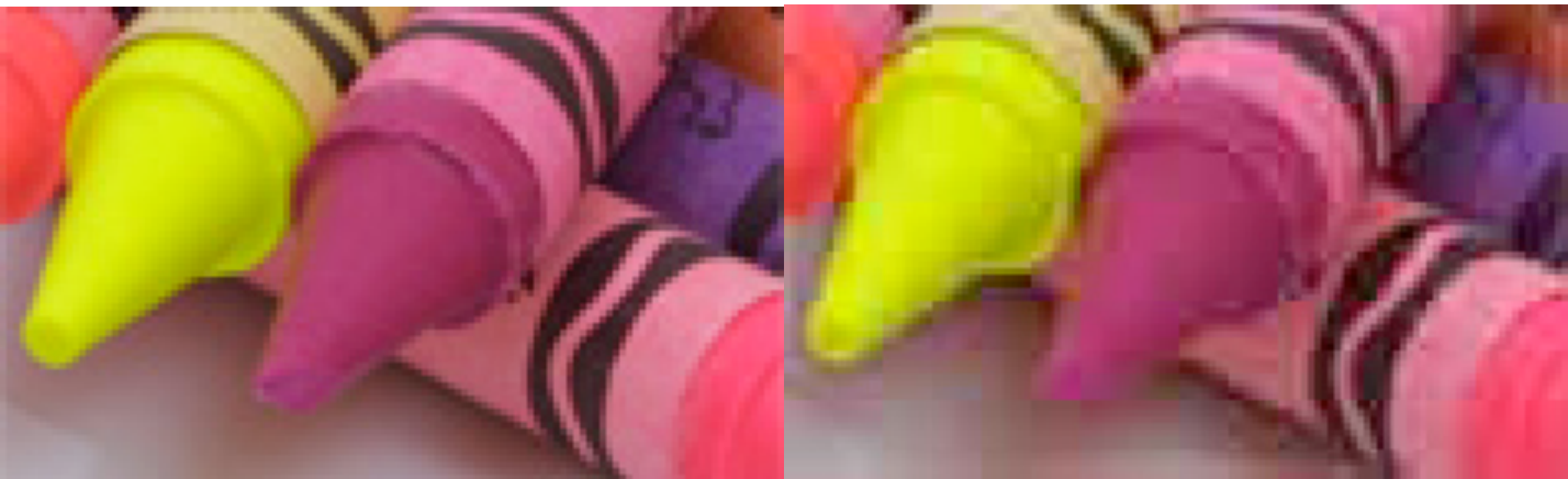
Moiré & Maze Patterns



Images from <http://www.dpreview.com/learn/?/key=sharpening>

Digital Artifacts

Sharpening Halos



100% Quality

10% Quality

Image from http://www.dpreview.com/learn/?/Glossary/Digital_Imaging/Aliasing_01.htm

Digital Artifacts

Compression Artifacts

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