Computer Science E-7
Exposing Digital Photography

Lecture 11: Color
November 21, 2011

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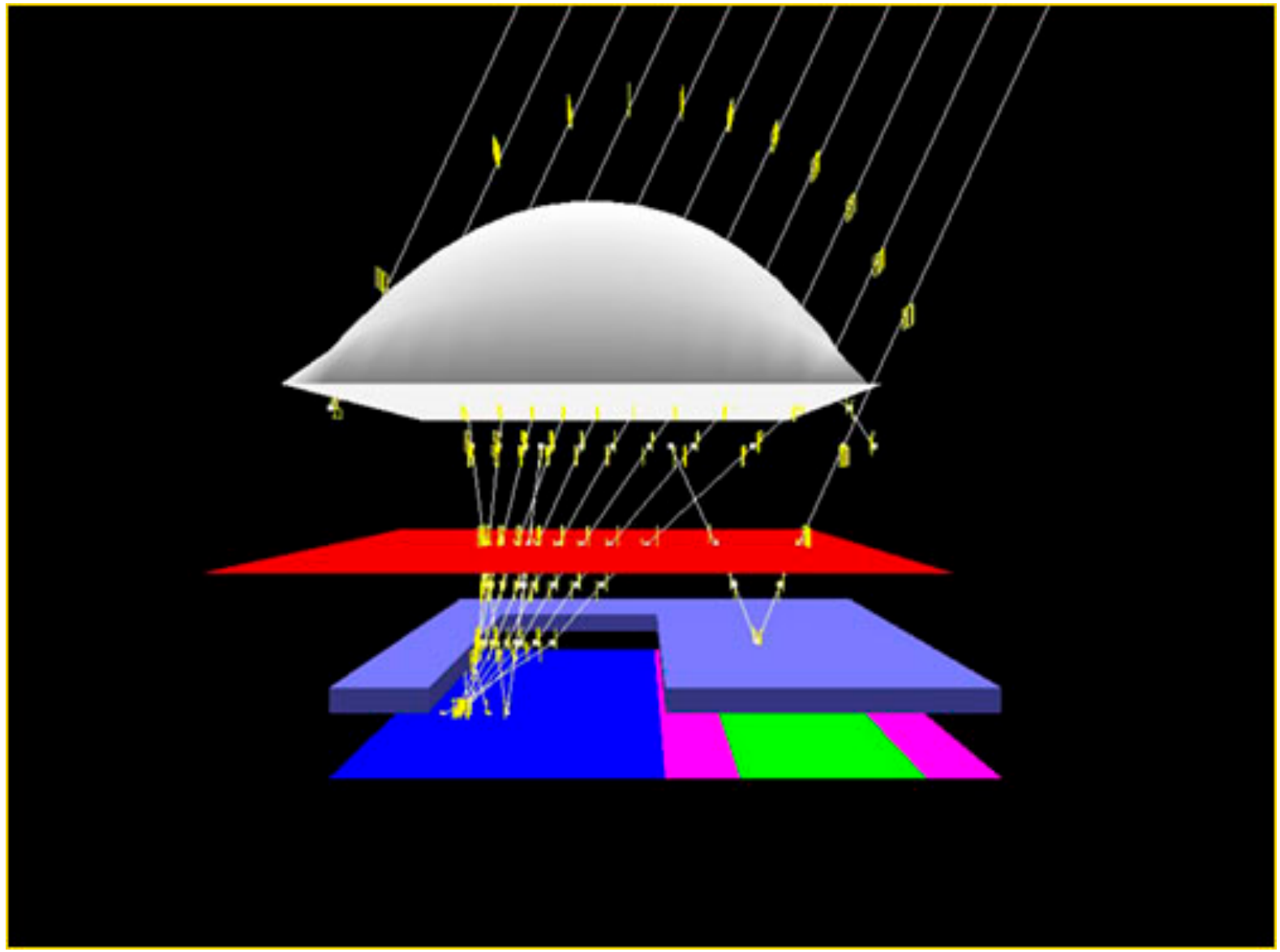


Image from Eastman Kodak, from http://www.luminous-landscape.com/essays/kodak-iss.shtml

Review

Pixel Construction

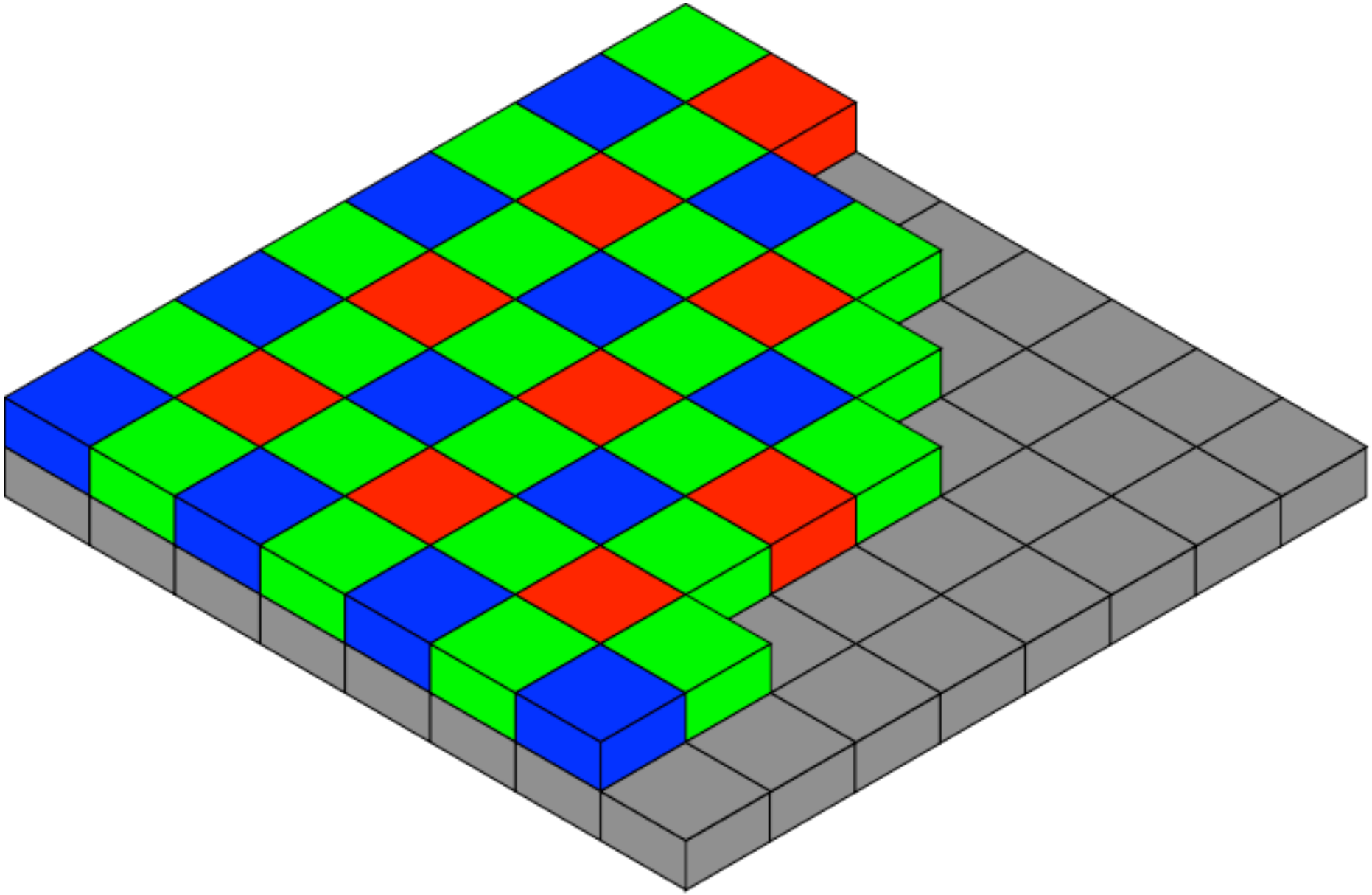


Image from http://en.wikipedia.org/wiki/Bayer_filter

Review

CFAs (Bayer Filter)

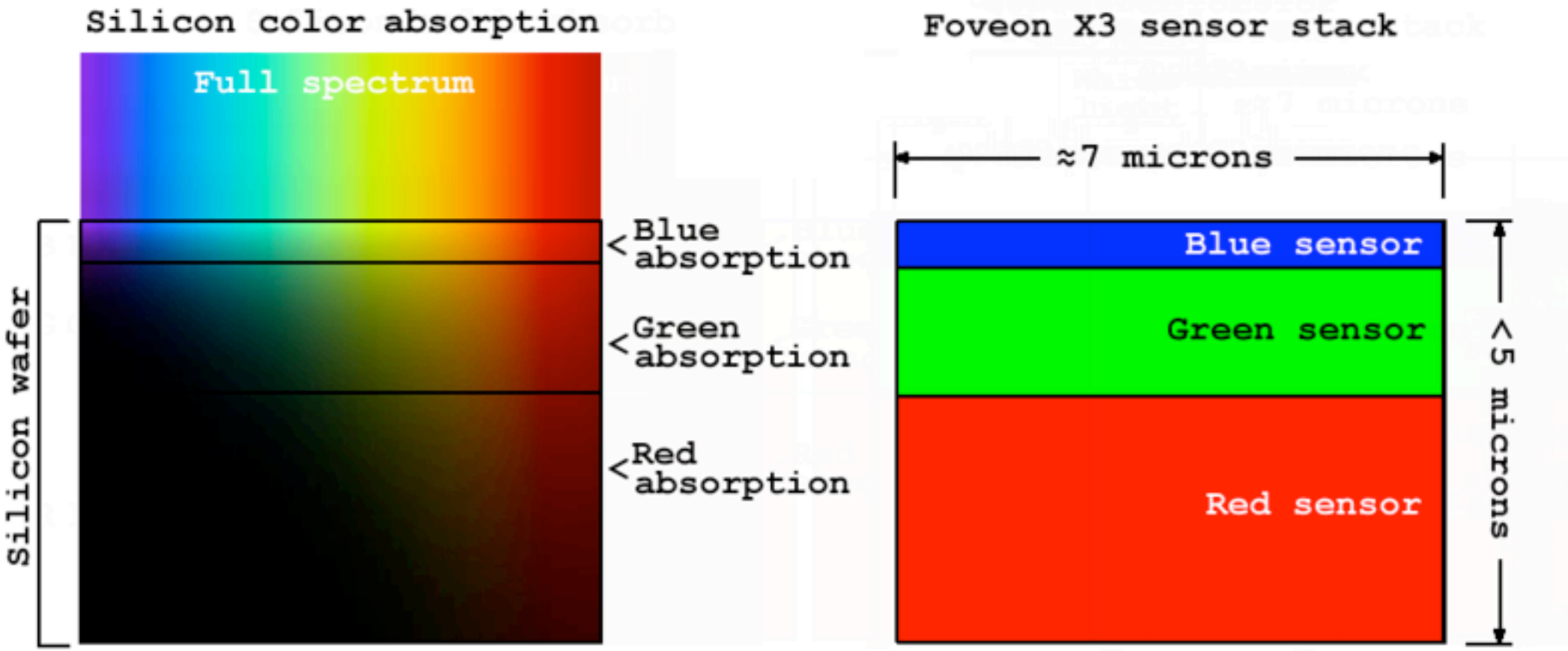


Image from http://en.wikipedia.org/wiki/Foveon_X3_sensor

Review

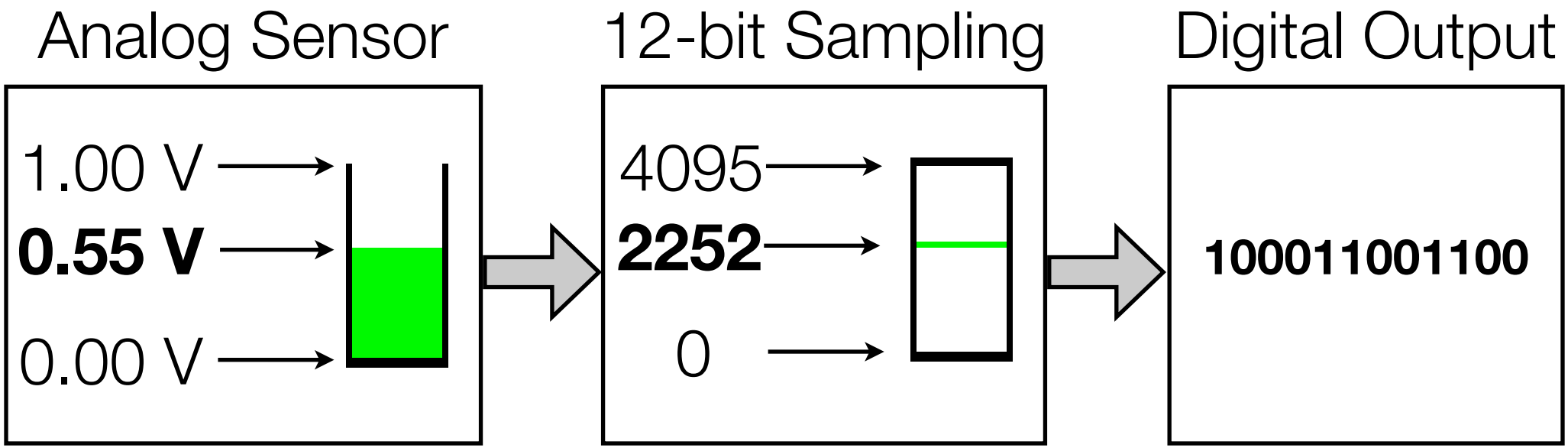
Foveon X3

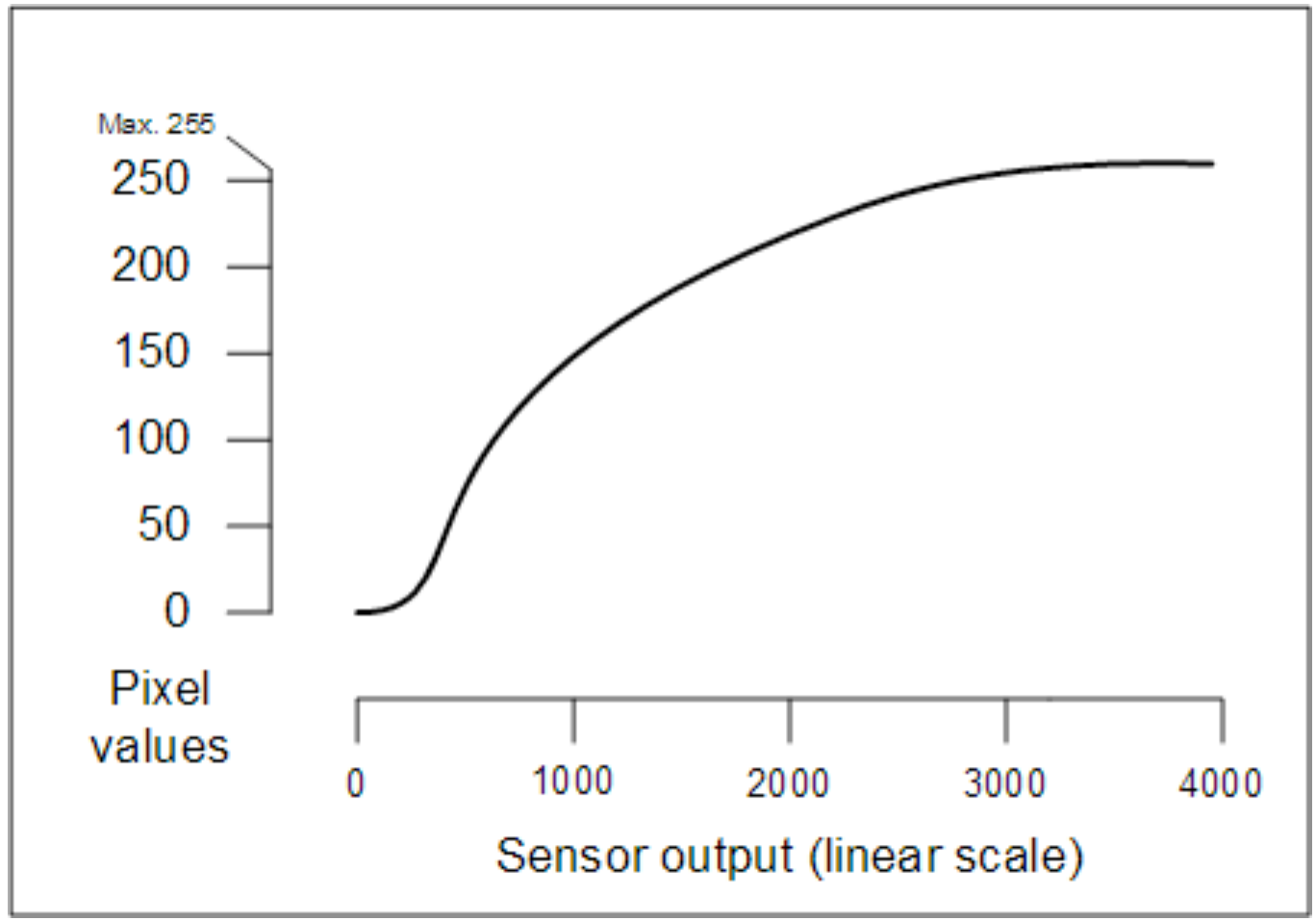
611s, ISO 100

Photo by Dan Armendariz, 2008

Review

Dynamic Range


Analog Sensor
12-bit Sampling
Digital Output
1.00 V
0.55 V
0.00 V
4095
2252
0
100011001100



Images from http://www.covingtoninnovations.com/dslr/Curves.html

Review

Tonal Curve

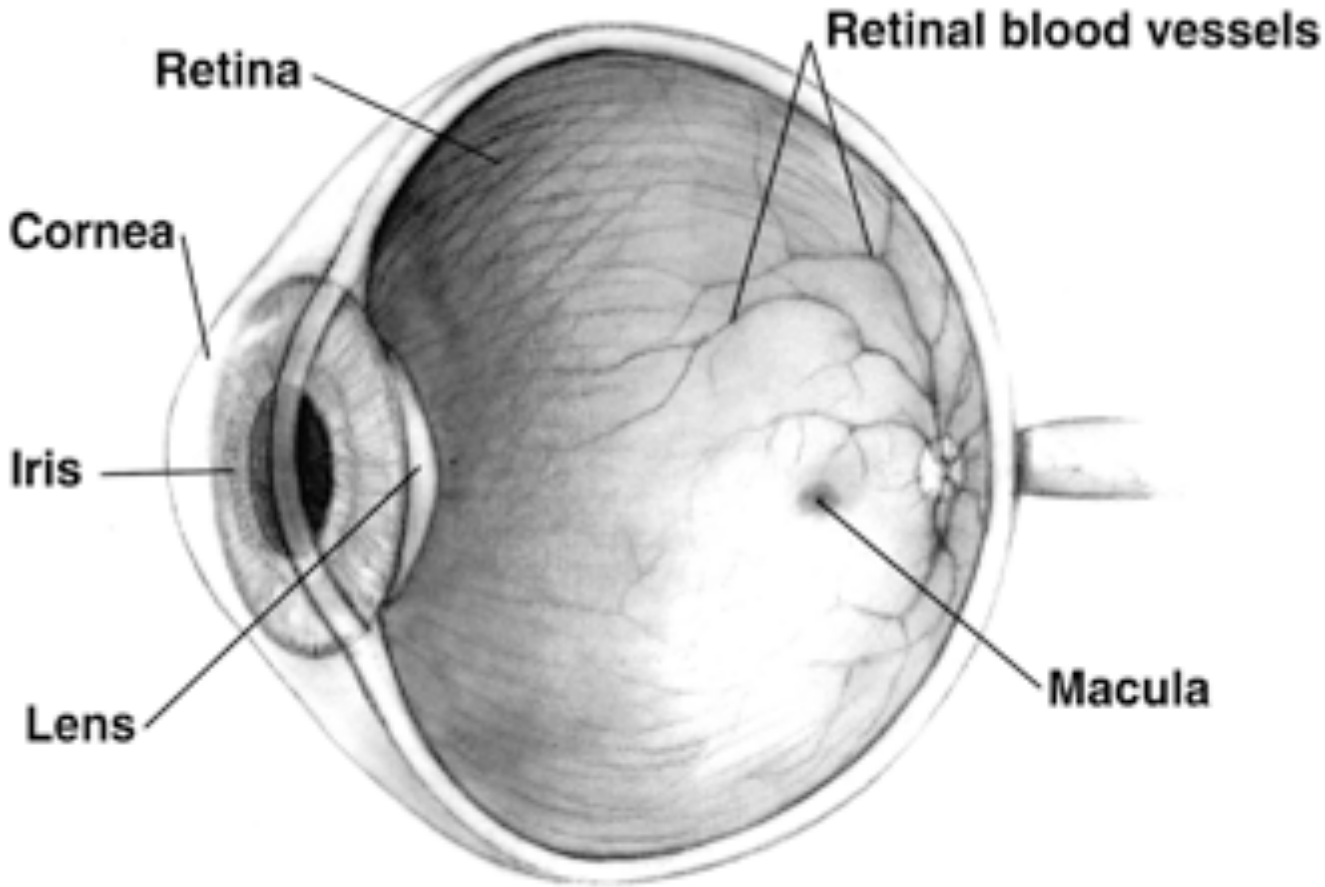


Image from http://en.wikipedia.org/wiki/Eye

The Eye

In a nutshell

Rods	**Cones**
Night vision	Day vision
More sensitive to light	Less sensitive to light
Not in fovea	Concentrated in fovea
22 times as many rods than cones in retina	
Monochromatic stimulus	Trichromatic (color) stimulus
Preference to detect motion	Preference to detect detail

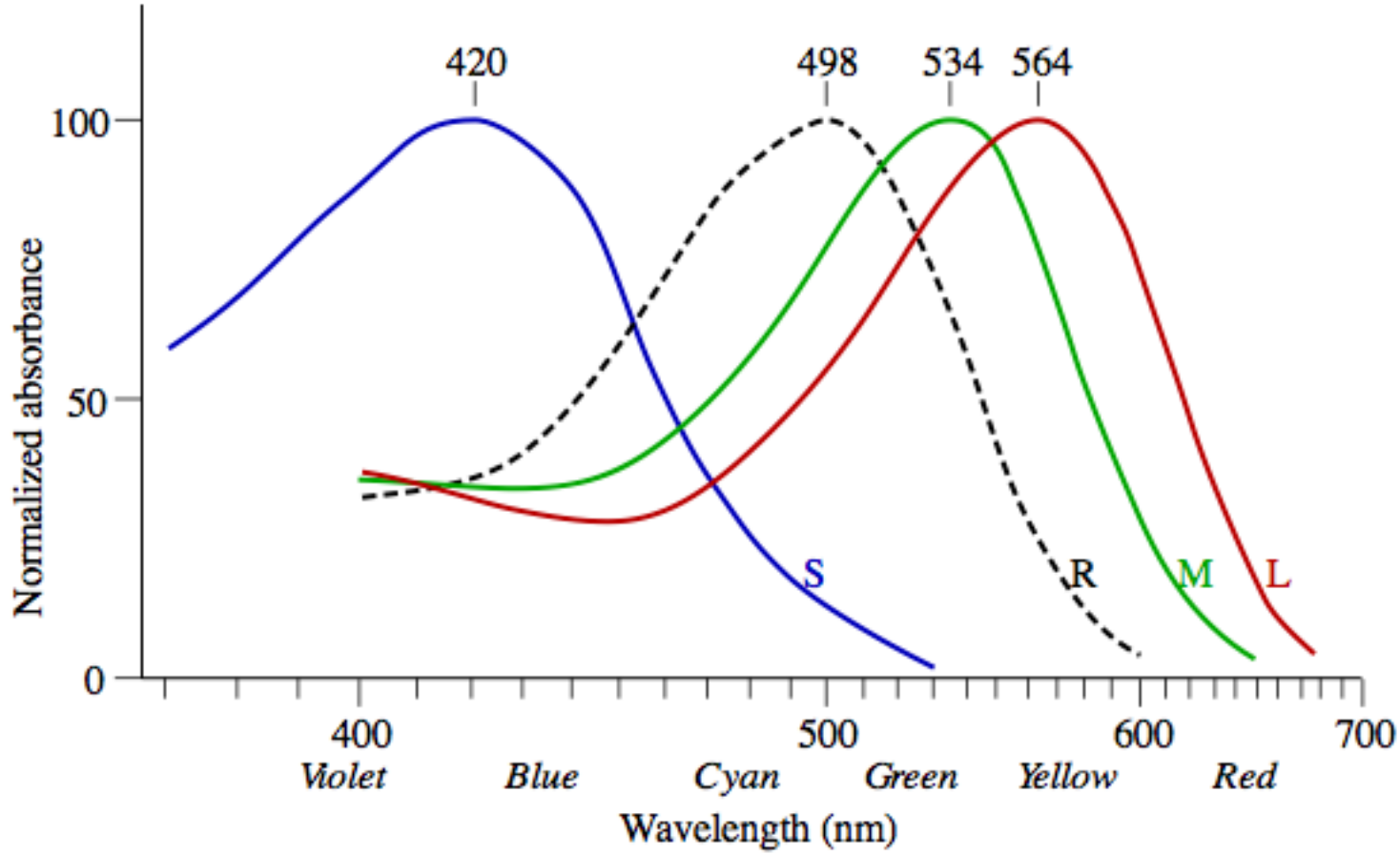


Image from http://en.wikipedia.org/wiki/Trichromacy

The Eye

Rods & Cones

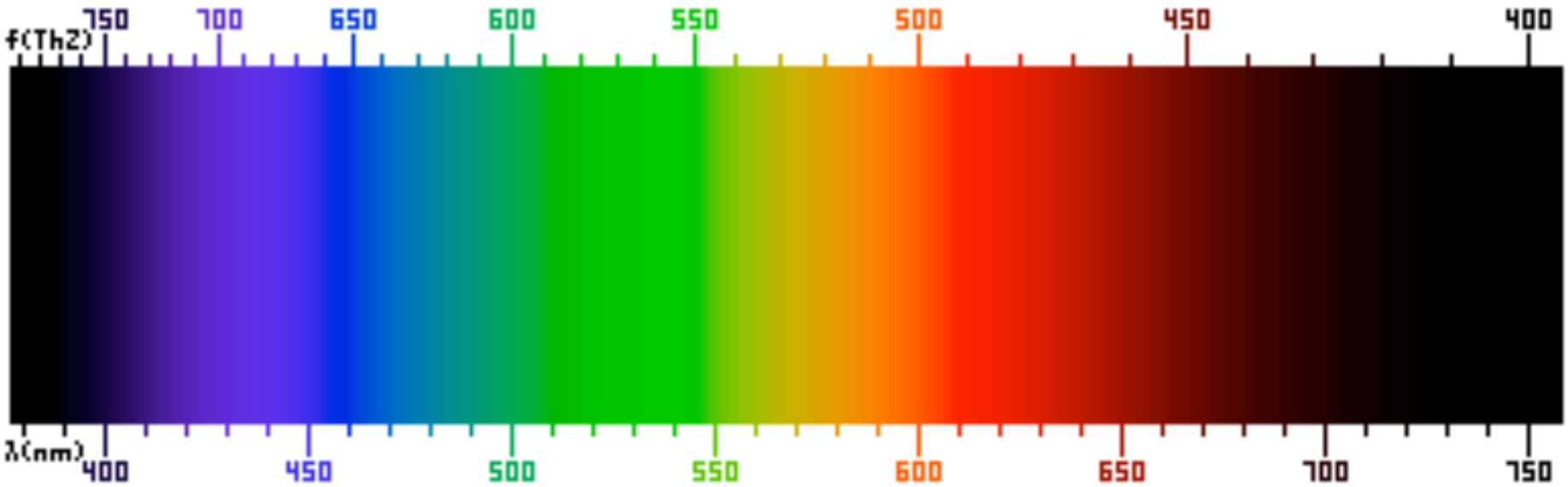


Image from http://en.wikipedia.org/wiki/Visible_spectrum

The Eye

Visible Spectrum

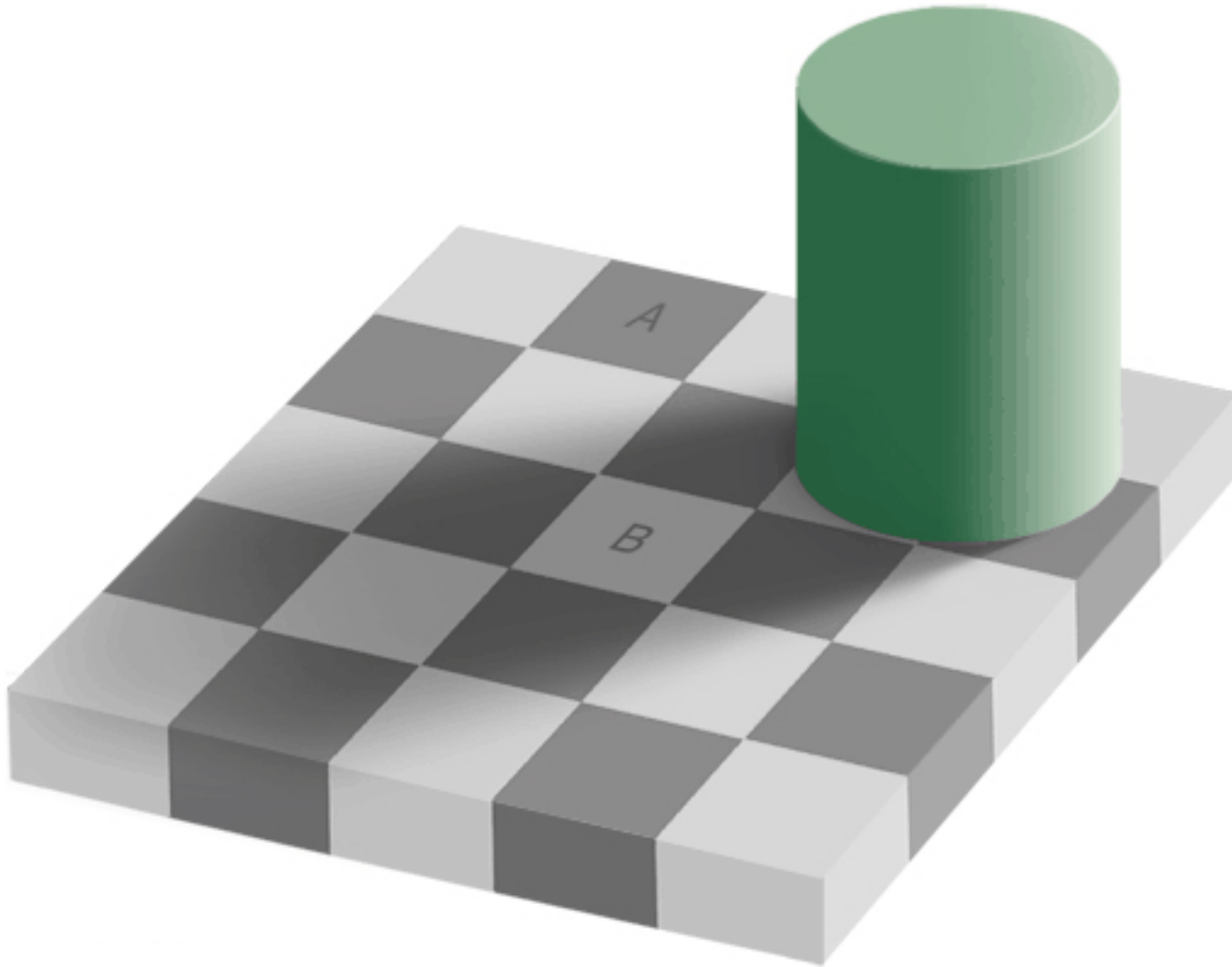
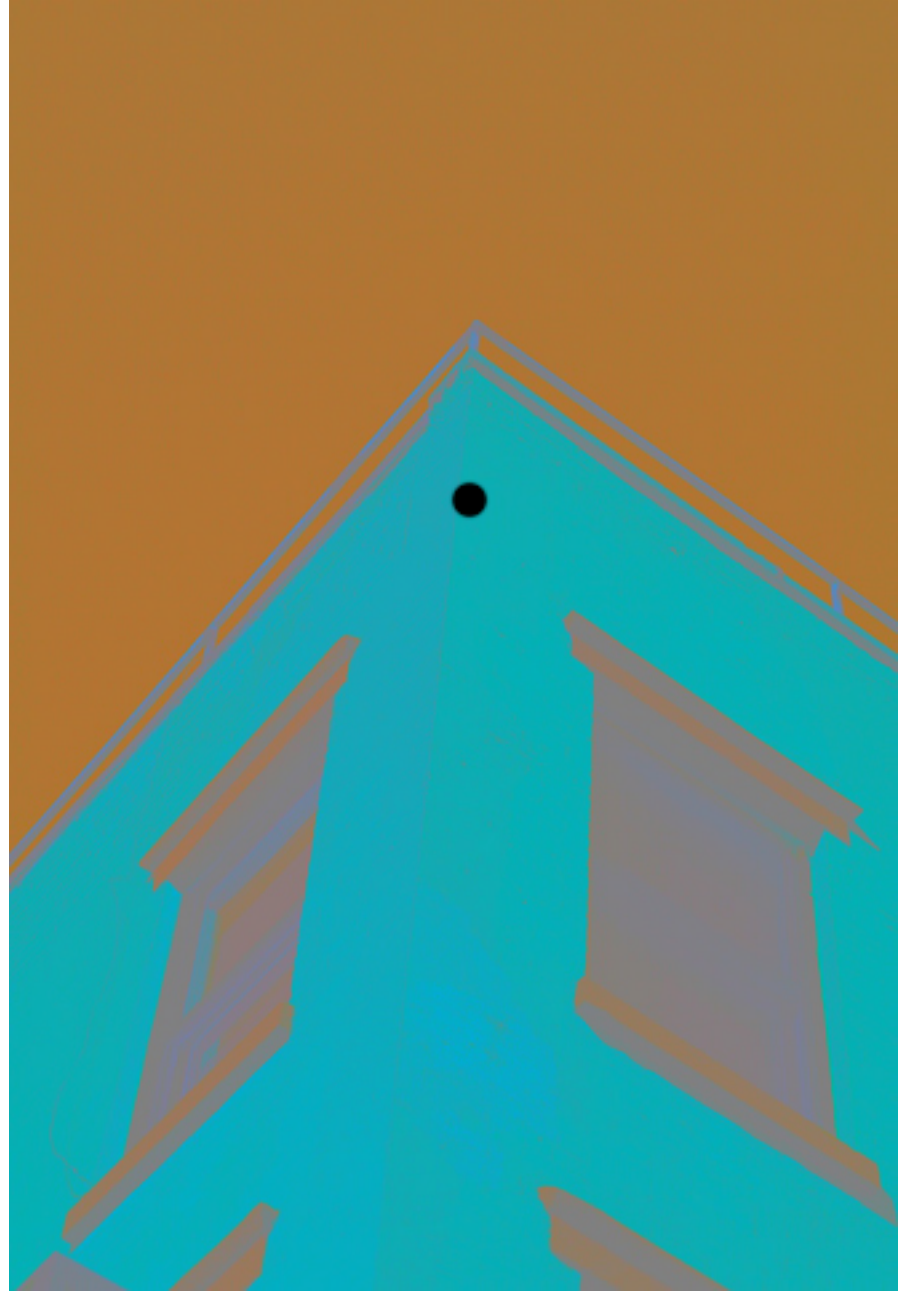


Image from http://en.wikipedia.org/wiki/Visible_spectrum

The Eye

Optical Illusions



The Eye

Optical Illusions

The Eye

Optical Illusions

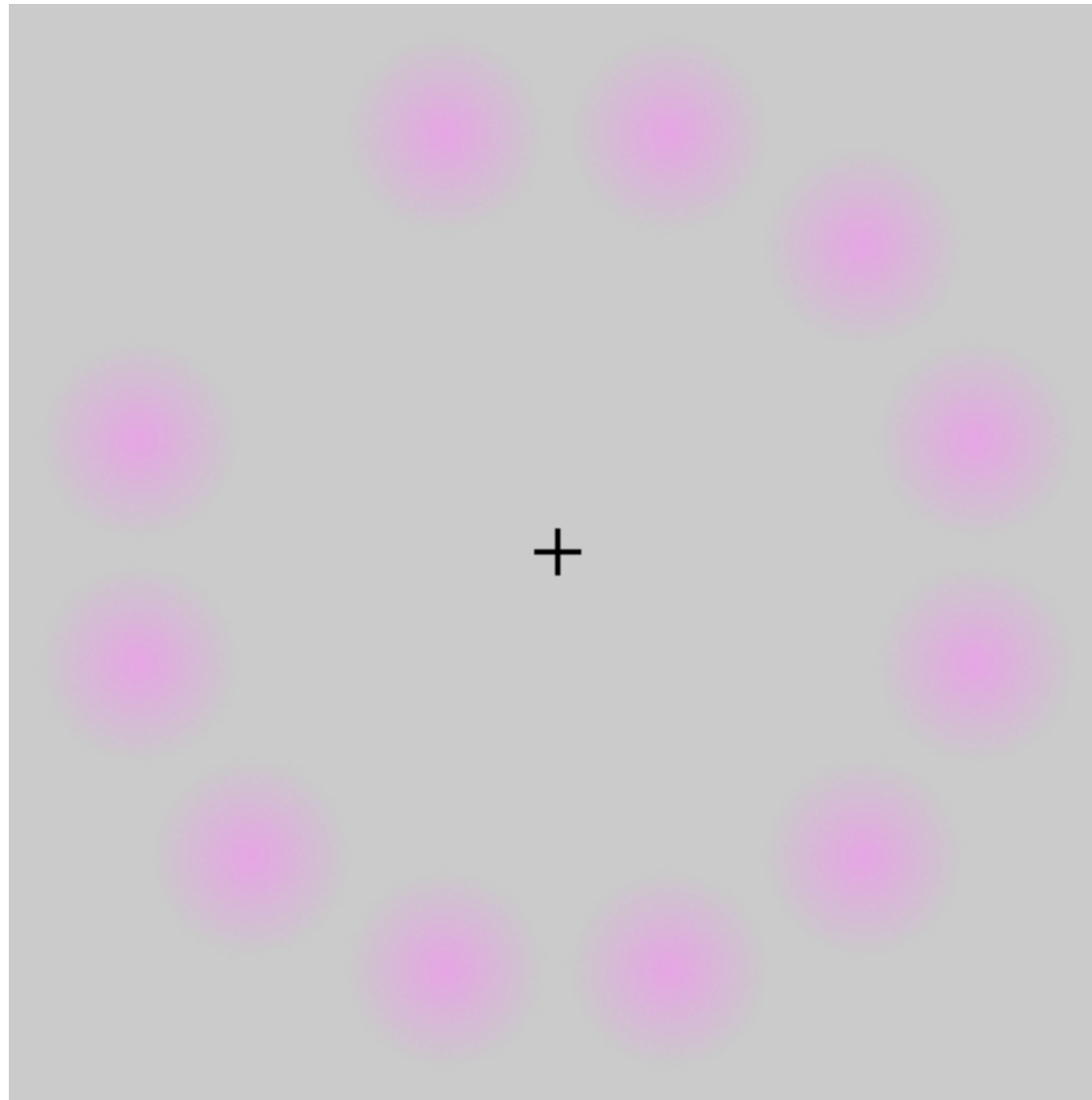


Image from http://en.wikipedia.org/wiki/Troxler's_fading

The Eye

Optical Illusions

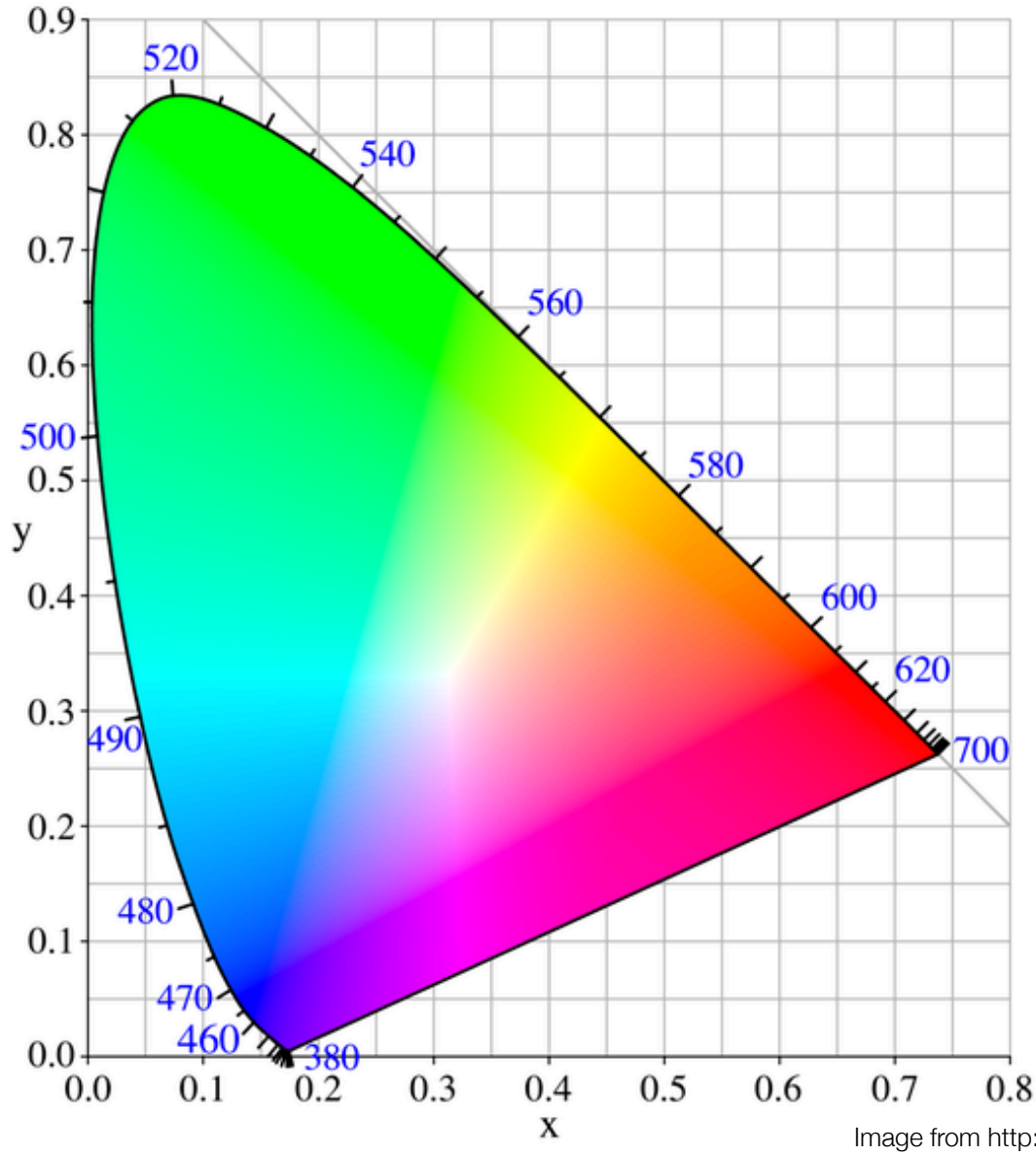


Image from http://en.wikipedia.org/wiki/Color

Color | Color Space

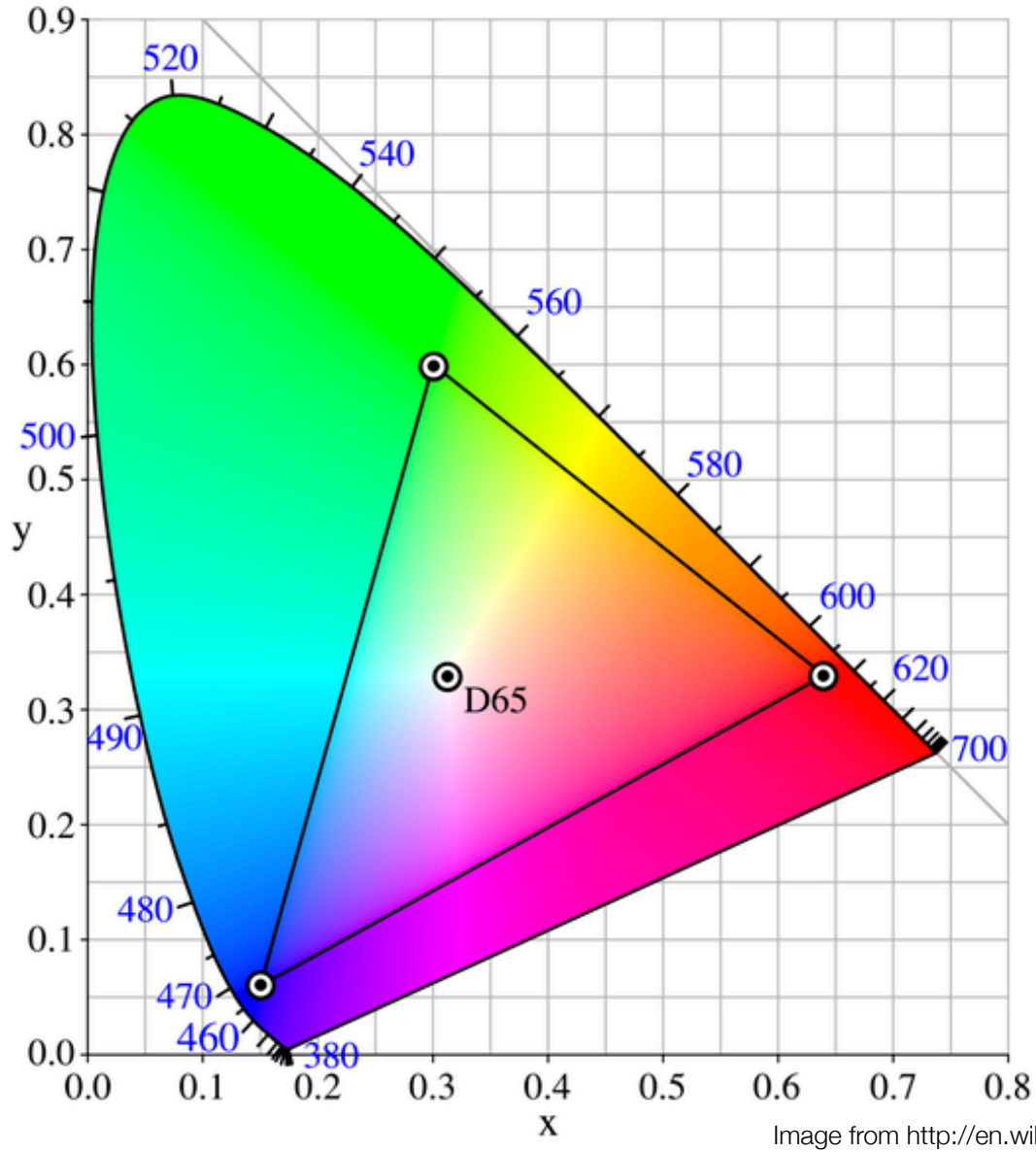


Image from http://en.wikipedia.org/wiki/SRGB_color_space

Color Spaces

sRGB

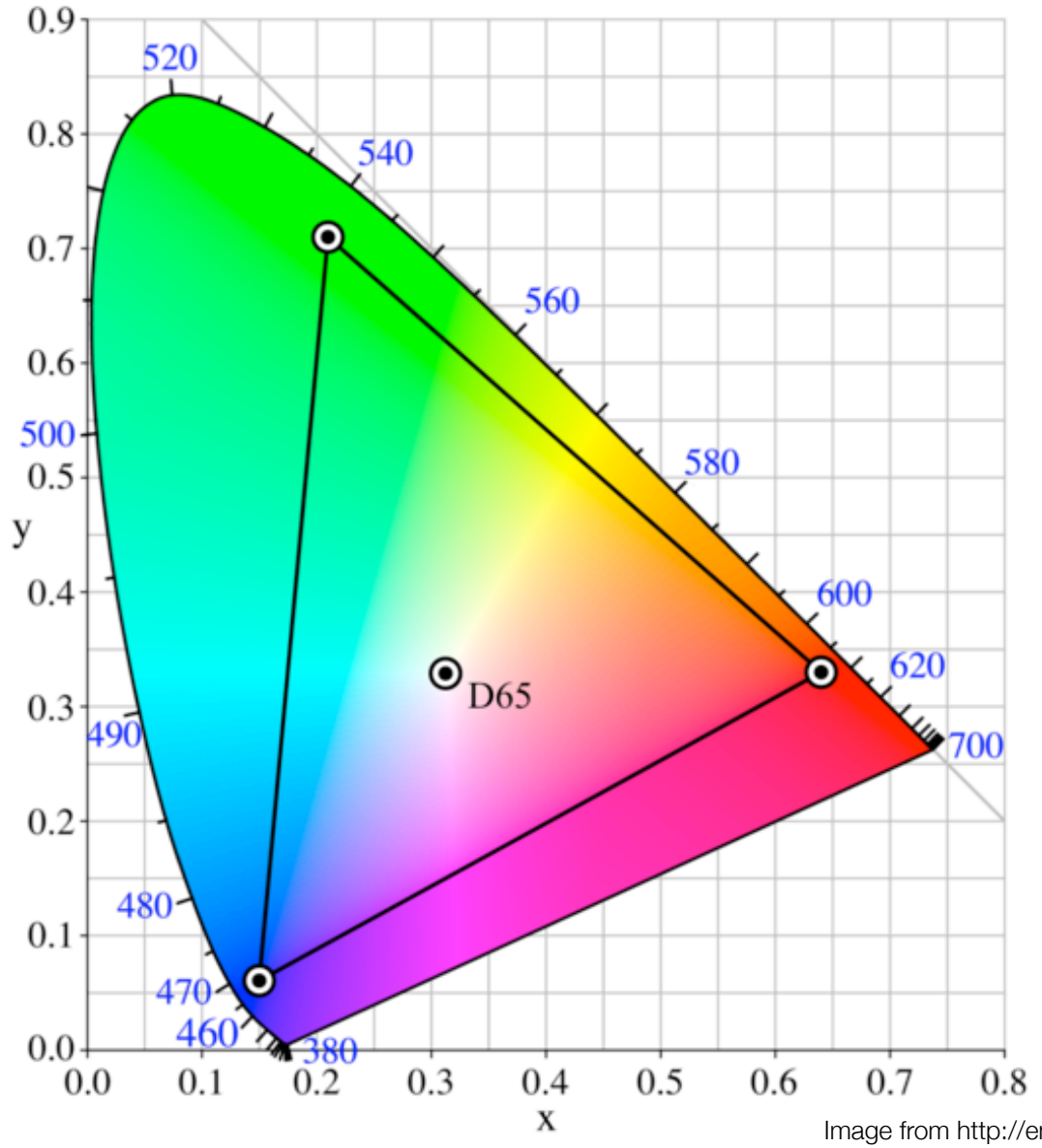


Image from http://en.wikipedia.org/wiki/Adobergb

Color Spaces

AdobeRGB

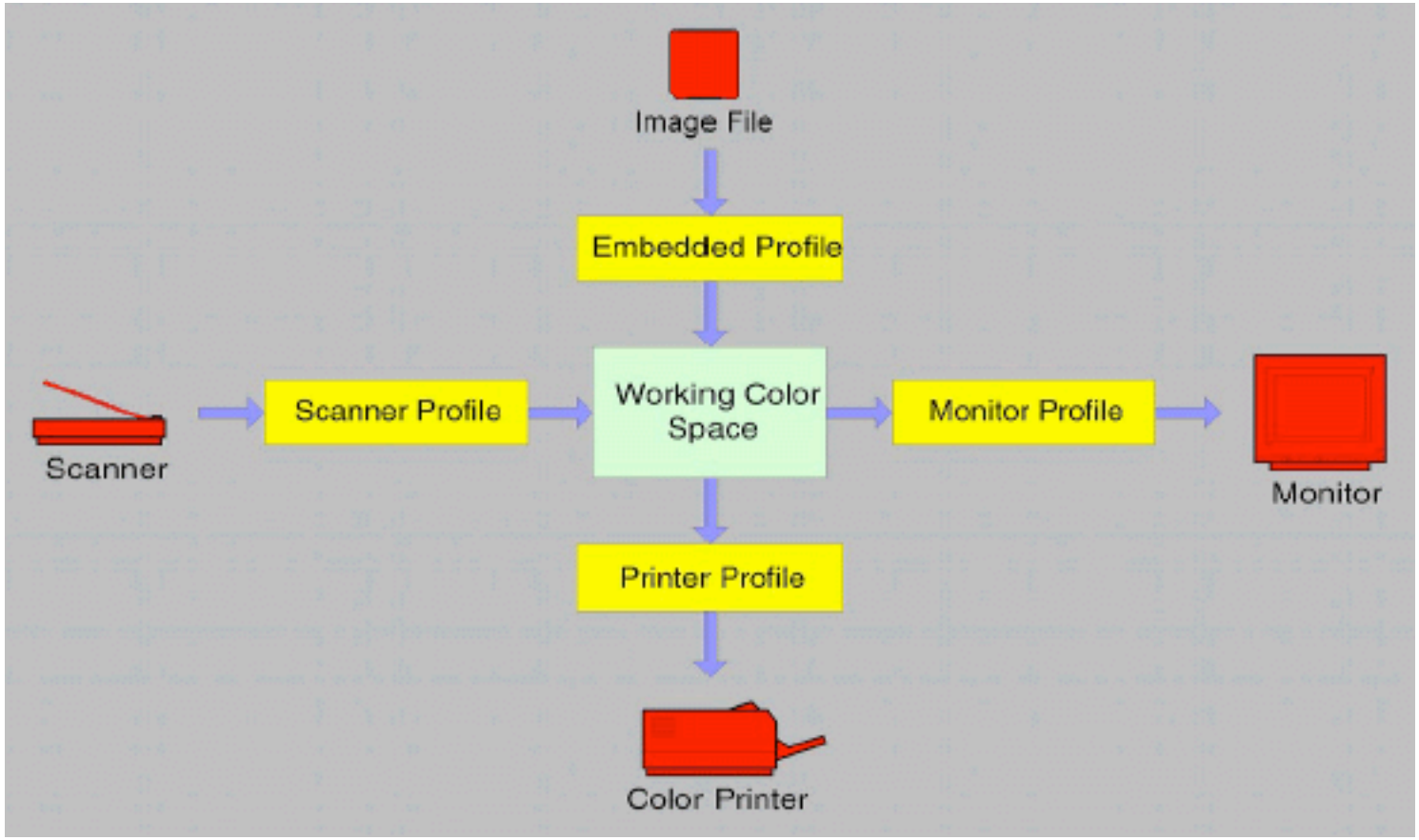


Image from http://www.normankoren.com/color_management.html

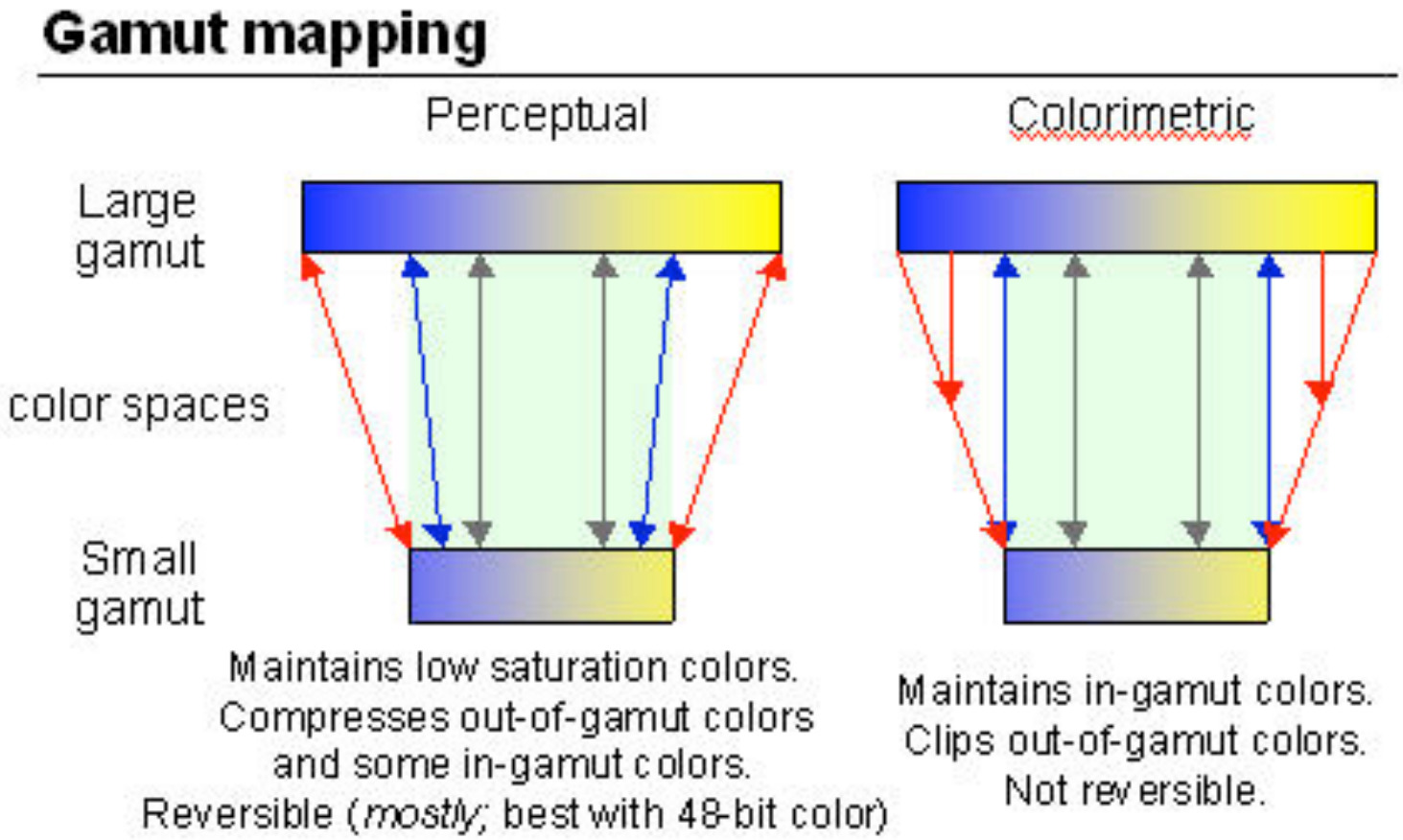


Image from http://www.normankoren.com/color_management.html

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

Color Management

Monitor Profiling

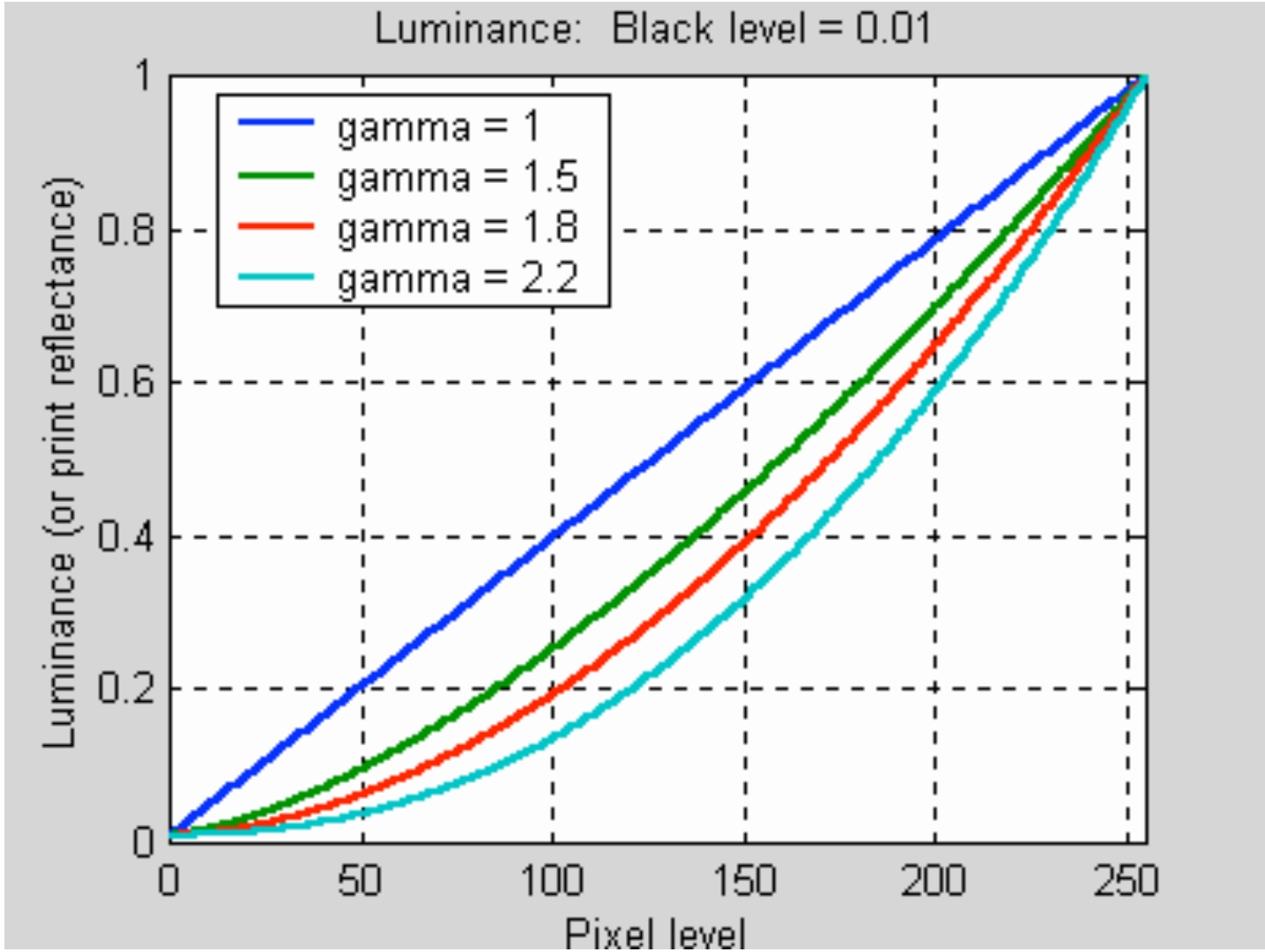


Image from http://www.normankoren.com/color_management_2A.html

Color Management

Gamma

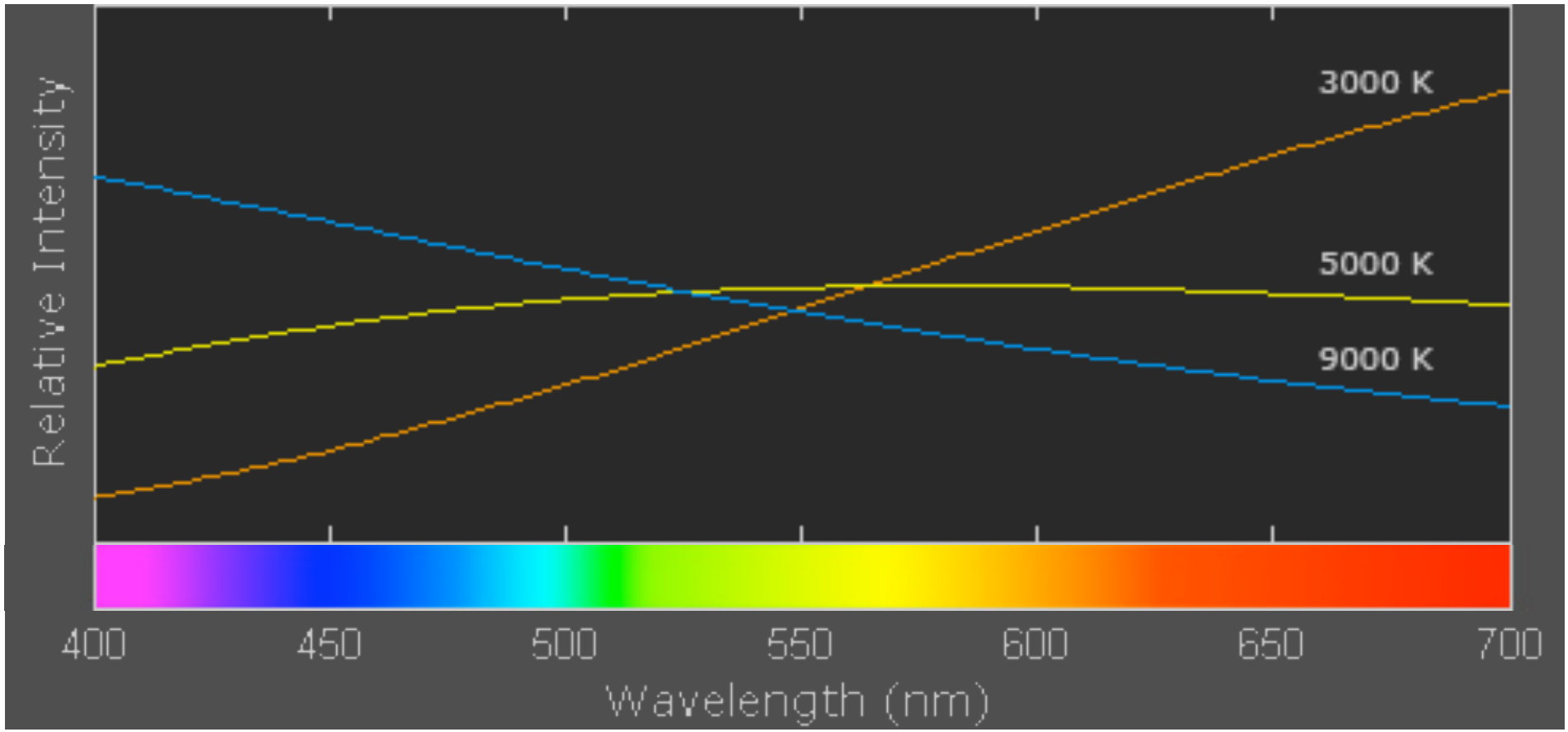


Image from http://www.cambridgeincolour.com/tutorials/white-balance.htm

Color | White Balance

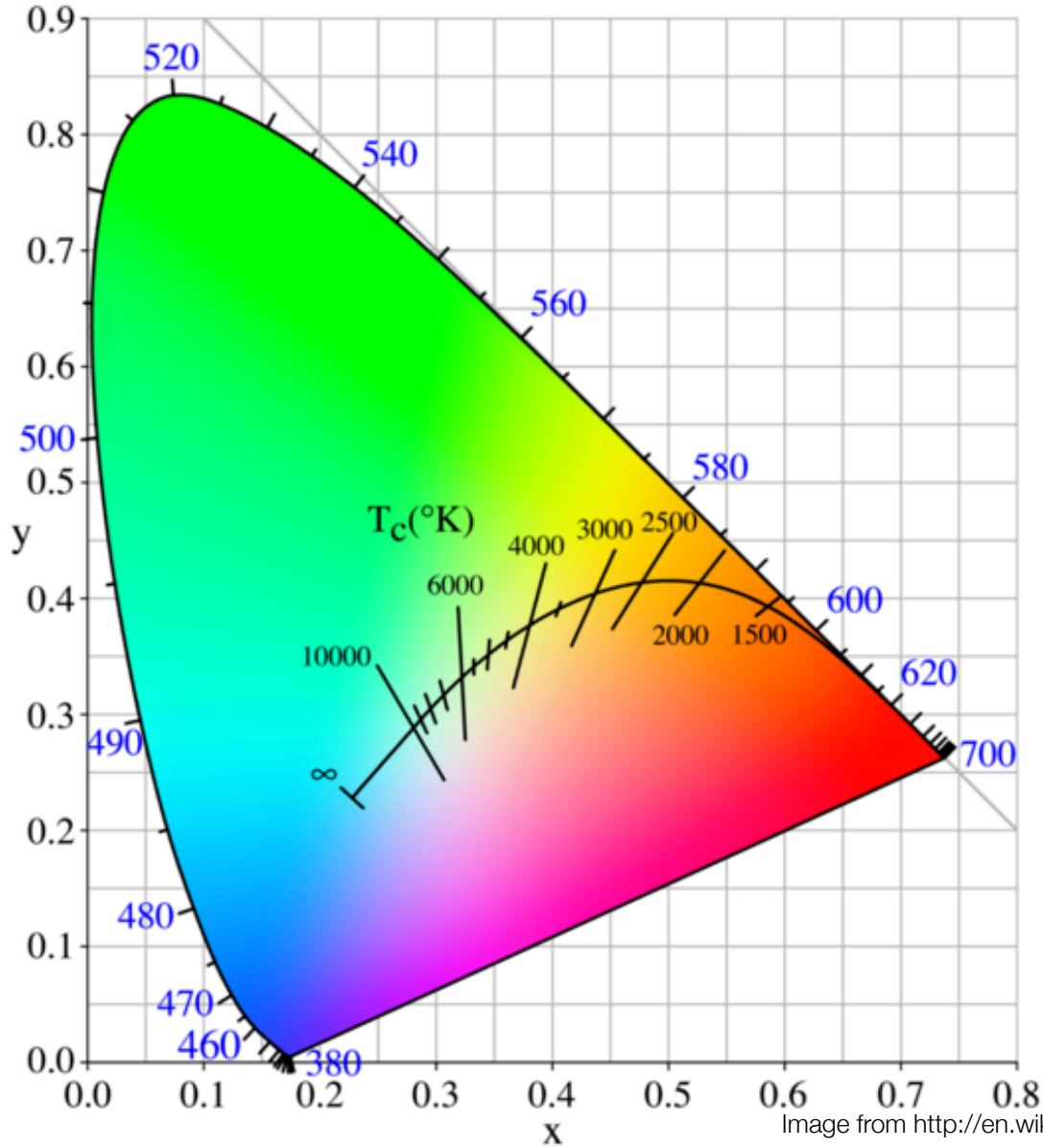


Image from http://en.wikipedia.org/wiki/Color_temperature

Color | 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

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