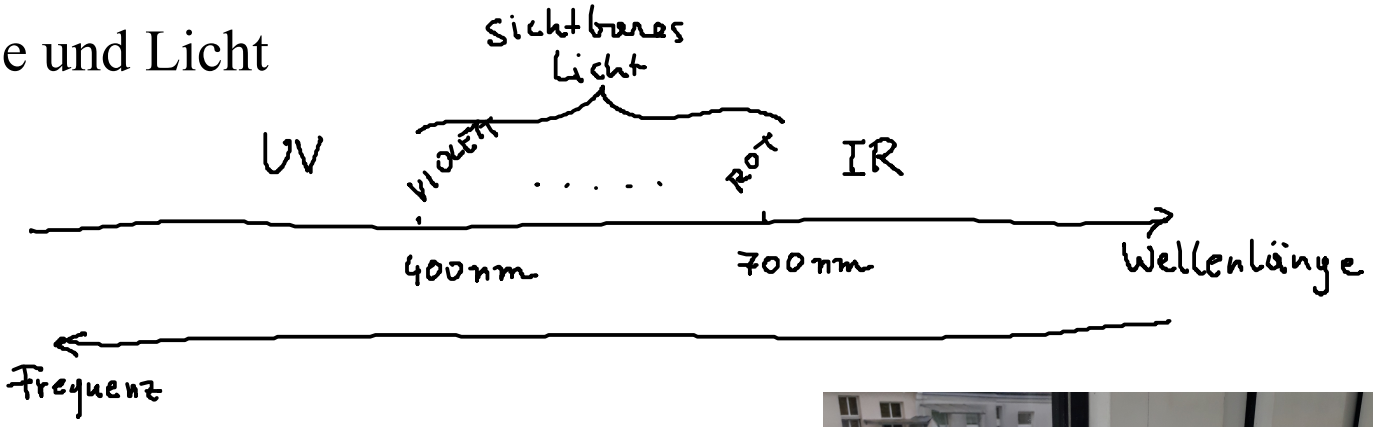
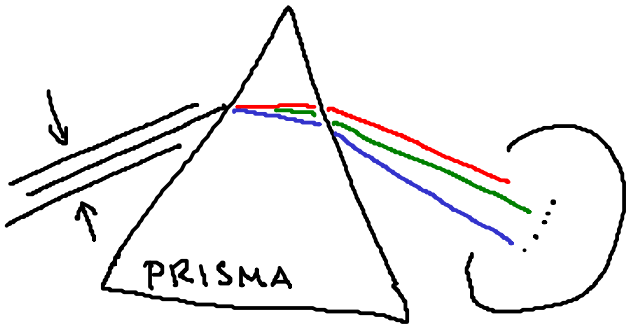
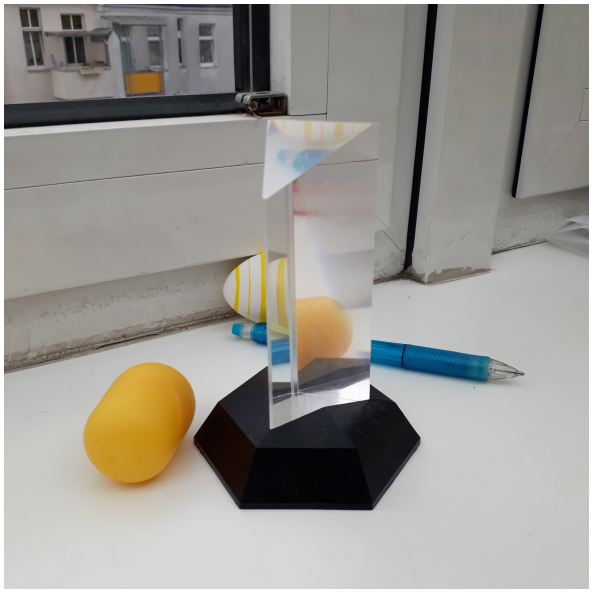
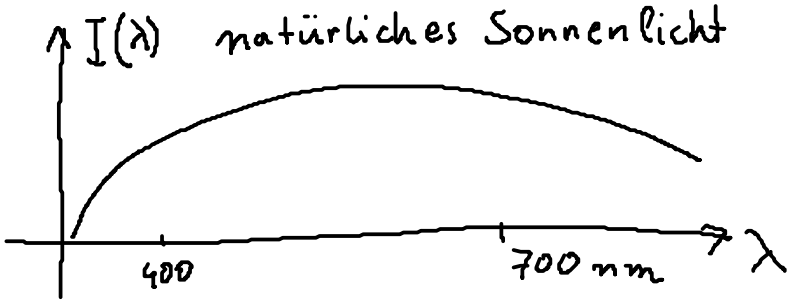
Farbe und Licht

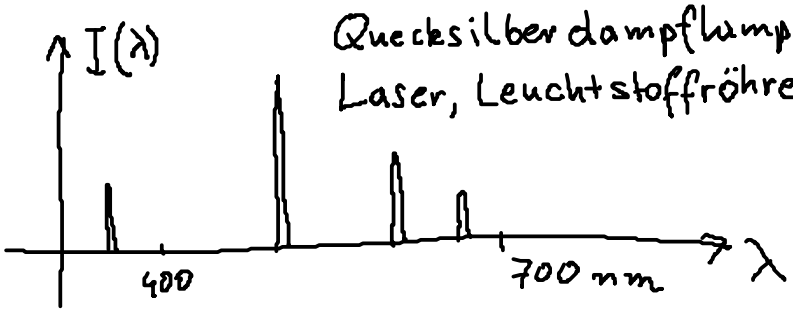




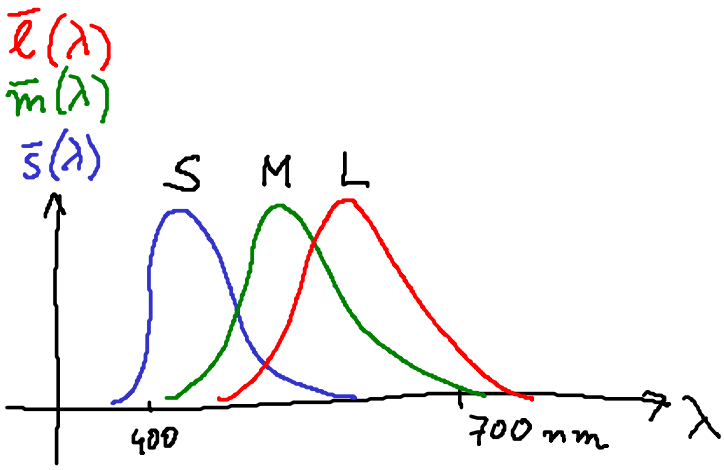


Spektrum an der Schrankwand





drei Arten von Zapfen (engl. cones)



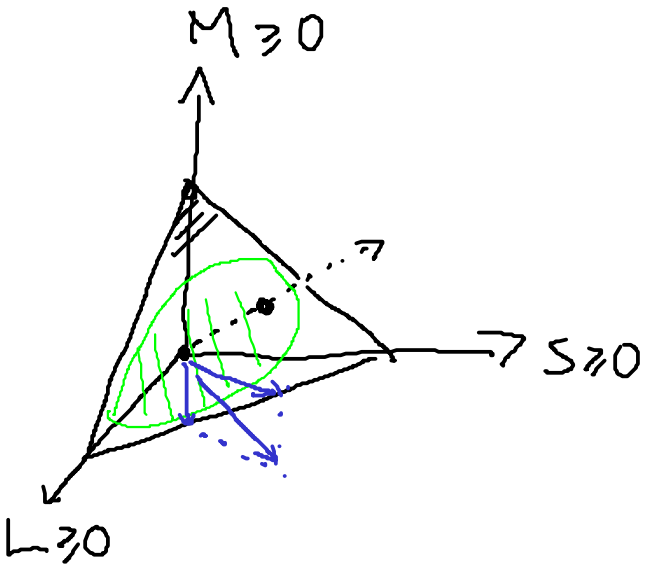
$$S = \int I(\lambda)\,\bar{s}(\lambda)\,d\lambda$$

$$M = \int I(\lambda)\,\bar{m}(\lambda)\,d\lambda$$

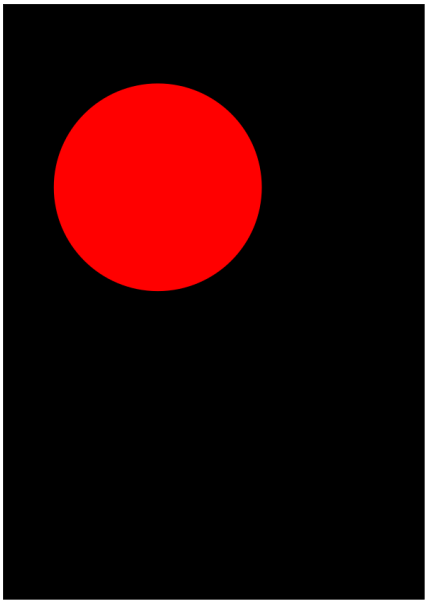
$$L = \int I(\lambda)\,\bar{l}(\lambda)\,d\lambda$$

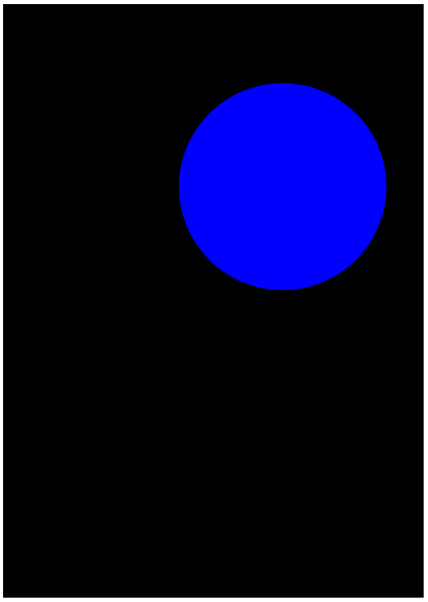
Unsere Farbwahrnehmung ist durch die 3 „Messwerte" S, M, L bestimmt.

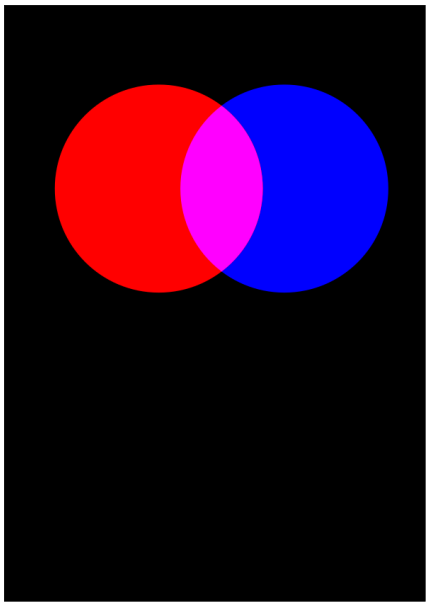
Der Raum unserer Farbwahrnehmung ist dreidimensional.



Additive Farbmischung





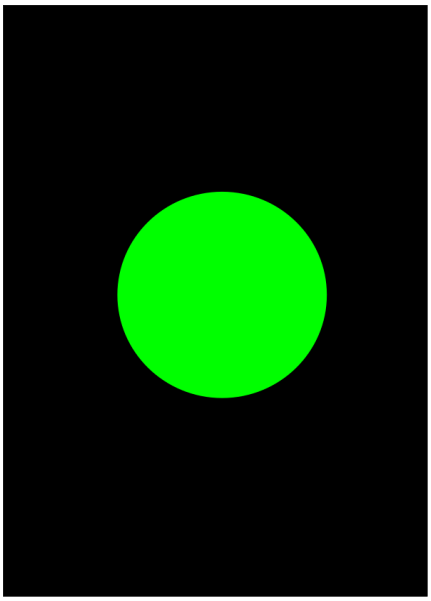


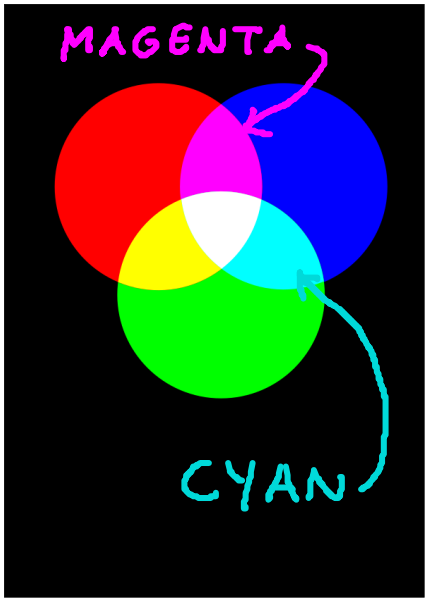
(S_1, M_1, L_1)

(S_2, M_2, L_2)

$\Downarrow$

~~$(S_1+S_2, M_1+M_2, L_1+L_2)$~~





$0{,}3\,(S_1, M_1, L_1)$

$+0{,}7\,(S_2, M_2, L_2)$

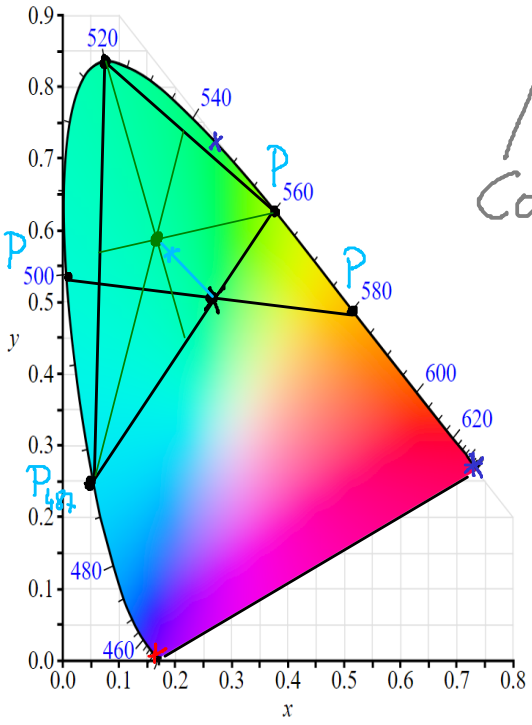
30% Anteil von (S_1, M_1, L_1) gemischt mit
70% Anteil von (S_2, M_2, L_2).

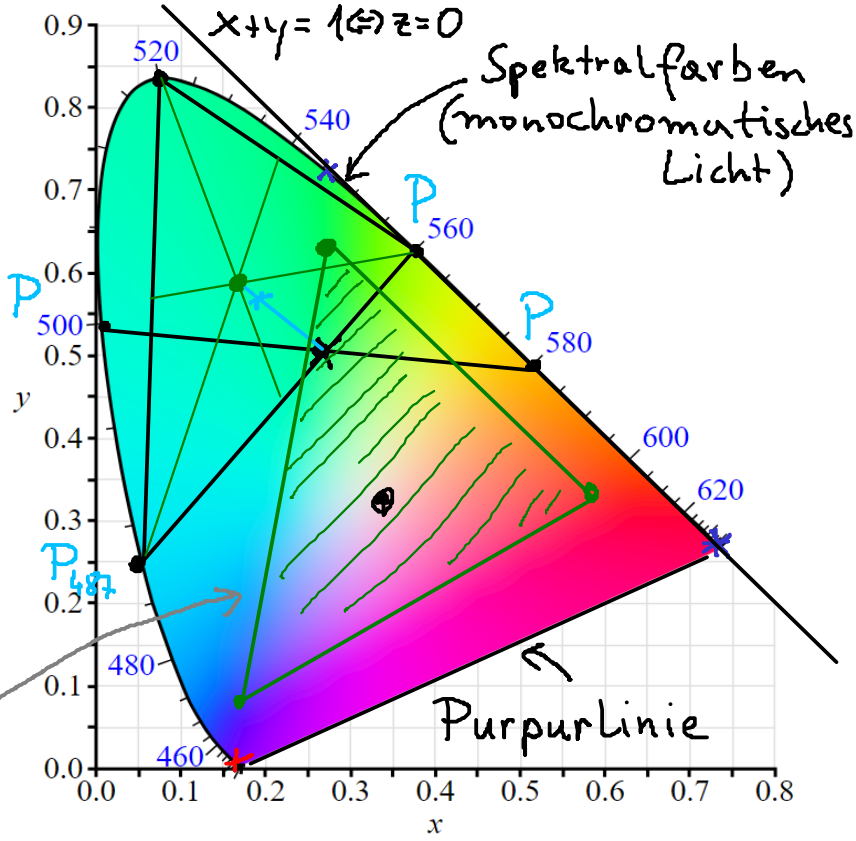
Der CIE-xyz Farbraum von 1931

- metamere Farben

$$0{,}45\, P_{500} + 0{,}55\, P_{580}$$
$$= 0{,}69\, P_{560} + 0{,}31\, P_{487}$$

eindeutig bis auf affine Transformationen





https://commons.wikimedia.org/w/index.php?curid=7889658

Color gamut (darstellbarer Farbbereich)

$x, y \geq 0$ z, $x+y+z=1$

$z = 1-x-y \geq 0$

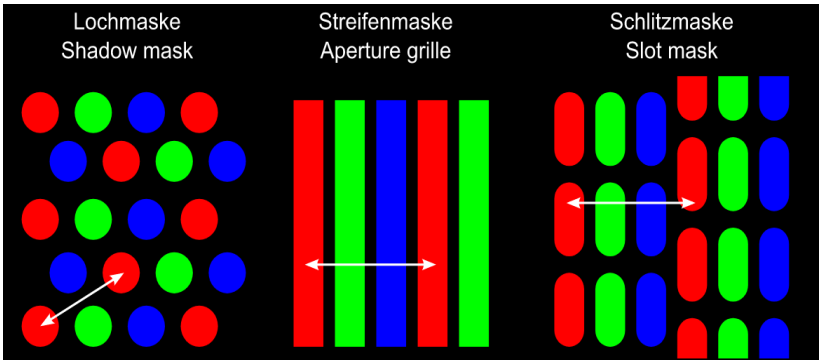
$x = y = \frac{1}{3} = z$: weiß

y ... Helligkeit

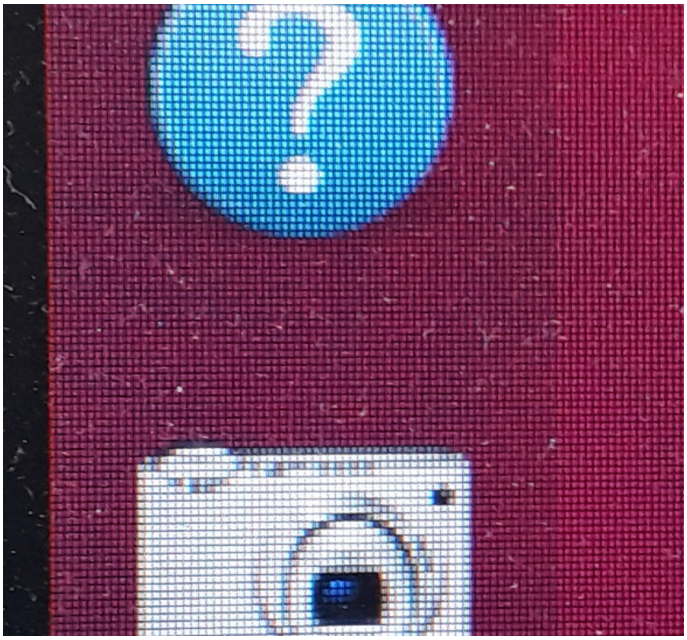
CIE = Commission internationale de l'éclairage

Bildschirmfarben : additive Farbmischung

Grundfarben: Rot, Grün, Blau (RGB)



Von Philipp M. Moore - Eigenes Werk, Gemeinfrei, https://commons.wikimedia.org/w/index.php?curid=9646497



RGB-Farbraum

$0 \leq r, g, b \leq 1$