大话成像之

数字成像系统 32讲

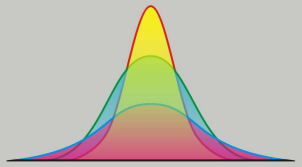
闪光灯

Maver Jiang

imaging algorithm specialist

staff image quality engineer

maver.jiang@gmail.com

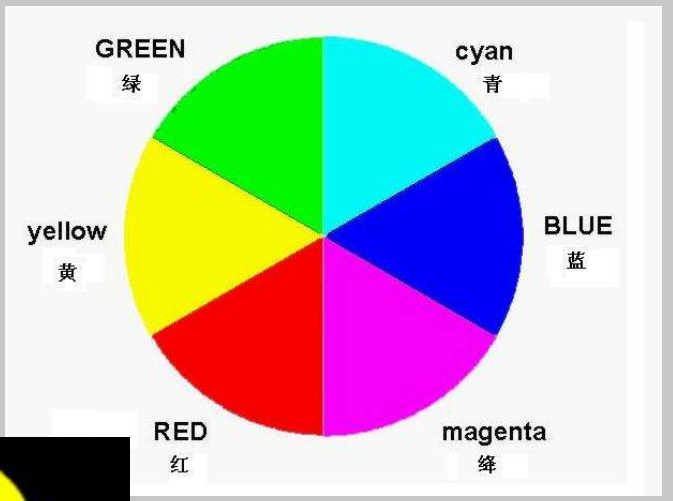


闪光灯的类型

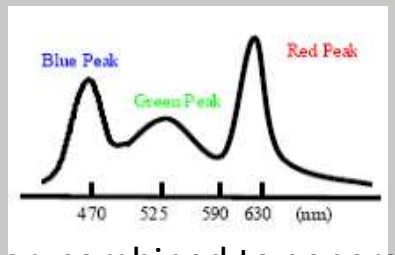
LED / dual LED /Xenon

LED闪光灯原理

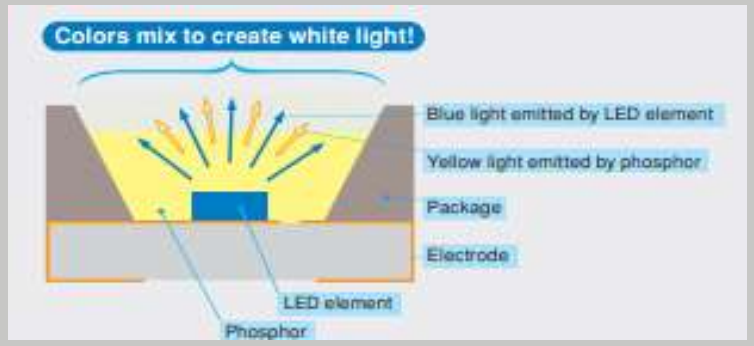
Newton color disc

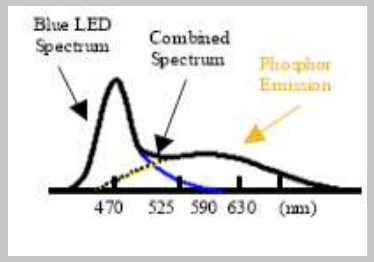


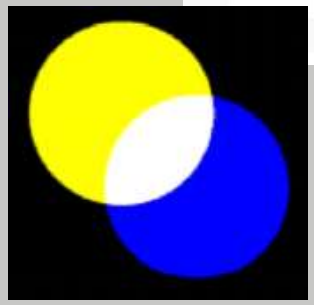
1：Three color led combined to generate white light



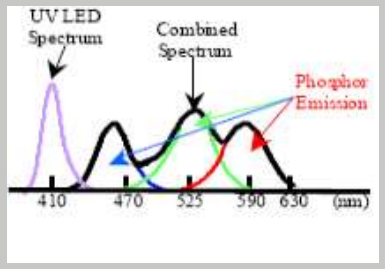
2：blue led and phosphor combined to generate white light

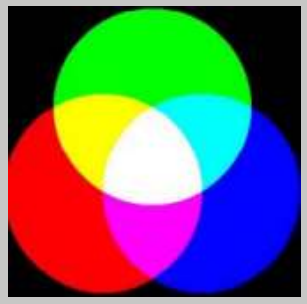


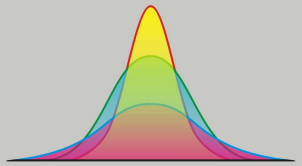




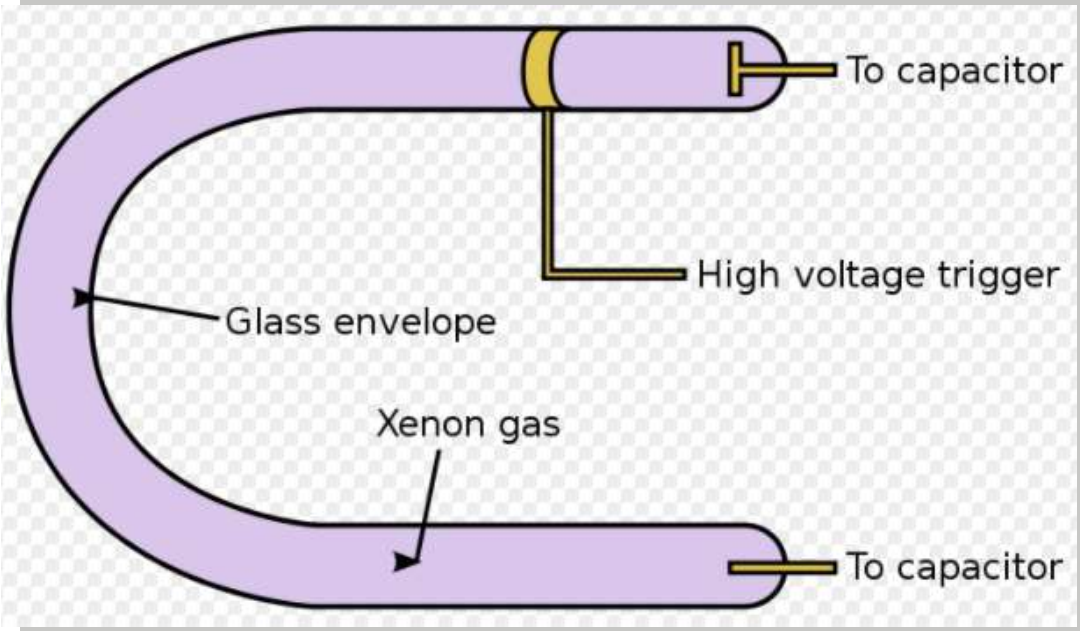
3：UV Led + RGB phosphor







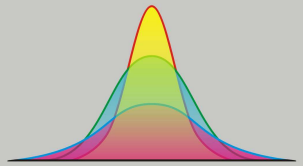
氙气闪光灯


To capacitor
High voltage trigger
Glass envelope
Xenon gas
To capacitor

各类型闪光灯的优缺点

	Xenon	LED	Dual LED
Intensity	10	1	1
Duration	1	10	10
CRI	10	5	8
flexibility	10	5	8
speed	10	10	10
Price/Size	1	10	10

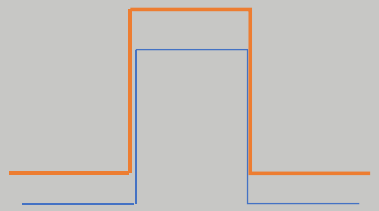
Xenon+Mechanical Shutter + LED



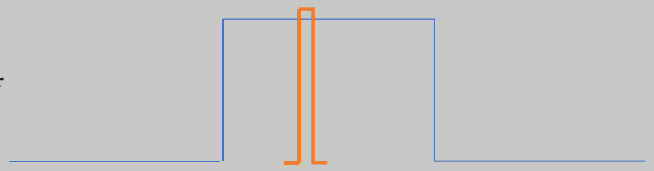
闪光灯的同步方式

Guide number = f-number × distance　　iso100

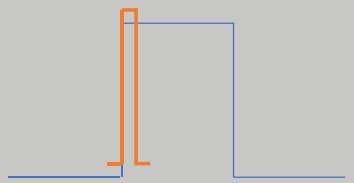
高速同步



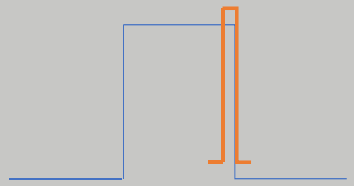
慢速同步

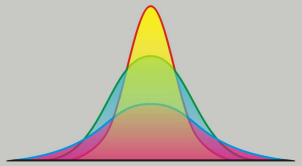


前帘同步

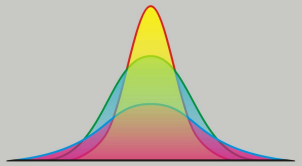


后帘同步





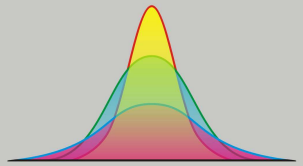
闪光灯的基本控制时序



为什么现在主流手机相机不采用氙灯

1. 耗电量大
2. 体积大，厚度厚
3. 需要配合机械快门+LED
4. EMC
5. 成本高

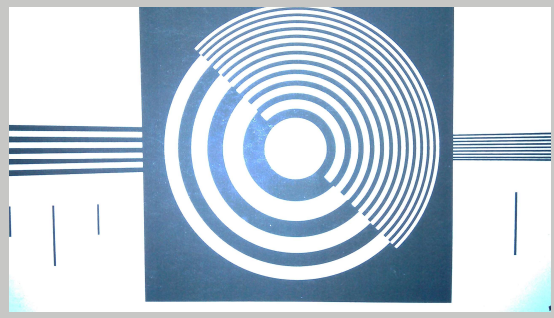
Xenon：Mechanical Shutter + LED



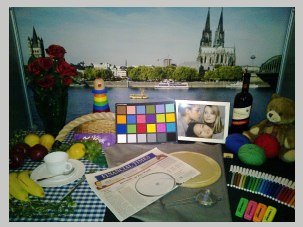
闪光灯照相的常见问题

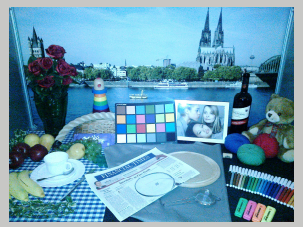
1. 反光的物体

2. Flash AE造成的过/欠曝



3. Flash AF造成的失焦

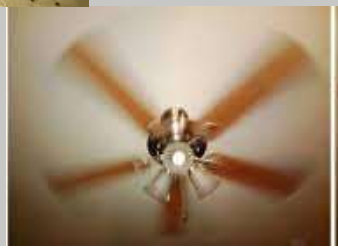


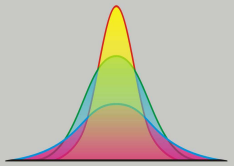


4. Flash AWB造成的色偏

5. 能量不够造成的远景不亮

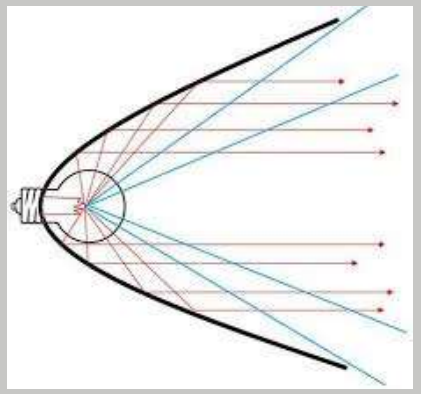
6. 曝光时间太长造成运动模糊



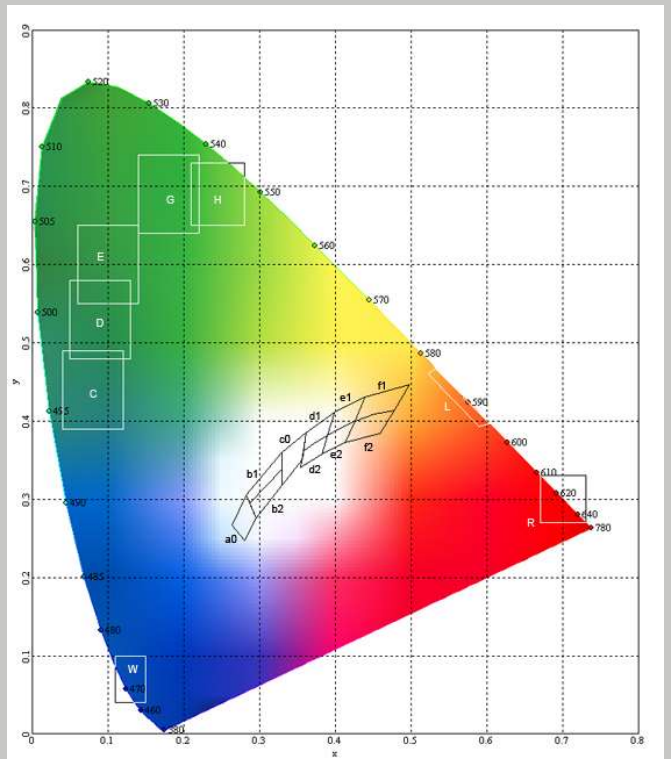


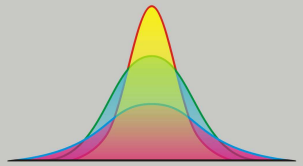
闪光灯的光学指标：

1. Relative Illuminance



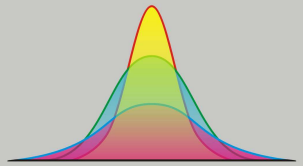
2. Chromaticity 一致性





THANKS

本课程由 Maver Jiang提供



大话成像之
数字成像系统 32 讲

内容目录