

大话成像之 数字成像系统 32讲

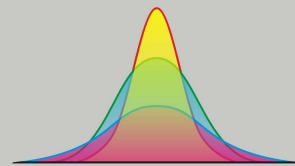
闪光灯

Maver Jiang

imaging algorithm specialist

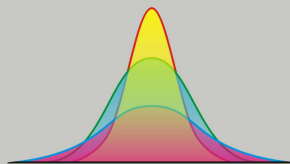
staff image quality engineer

maver.jiang@gmail.com



闪光灯的类型

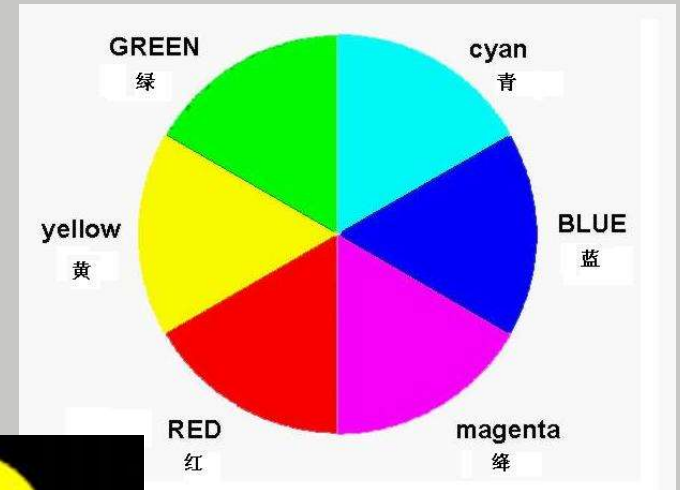
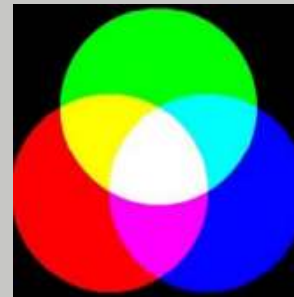
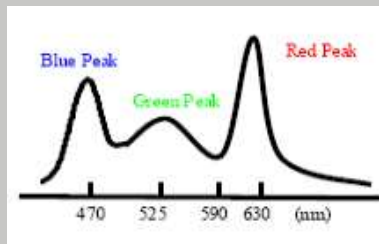
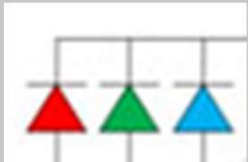
LED / dual LED / Xenon



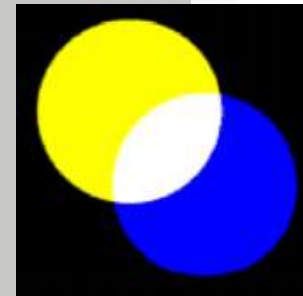
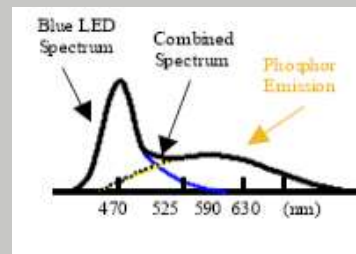
LED闪光灯原理

Newton color disc

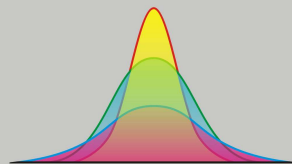
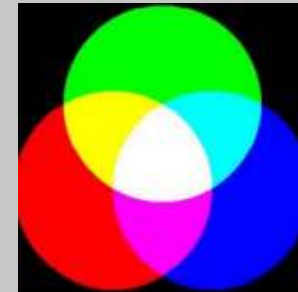
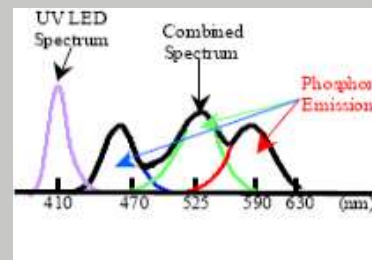
1: Three color led combined to generate white light



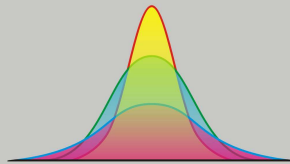
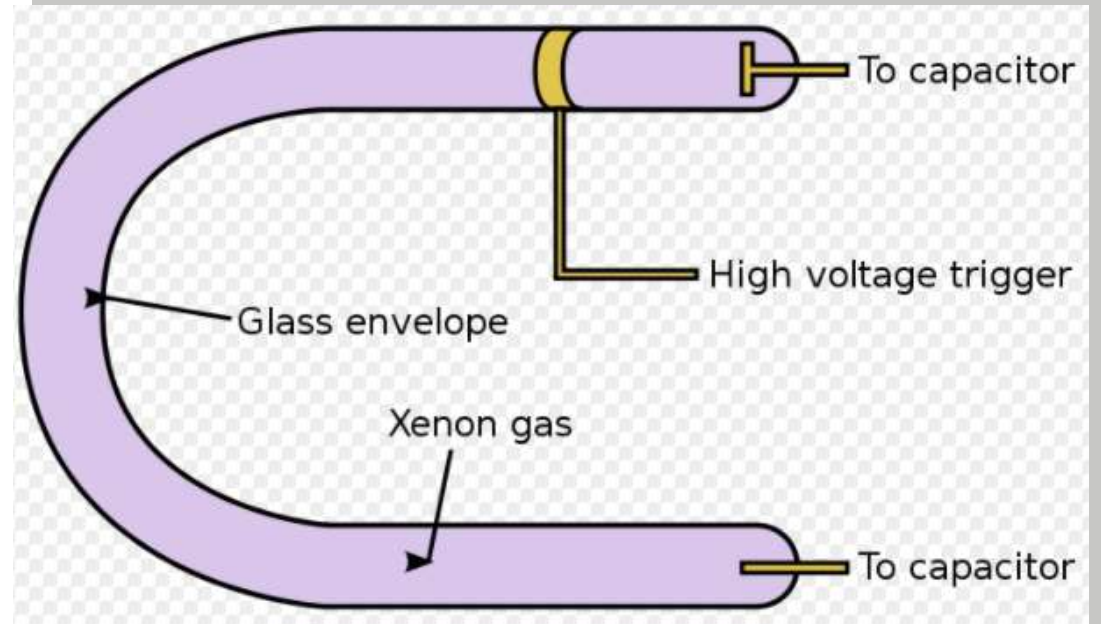
2: blue led and phosphor combined to generate white light



3: UV Led + RGB phosphor



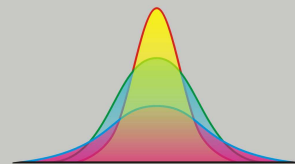
氙气闪光灯



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

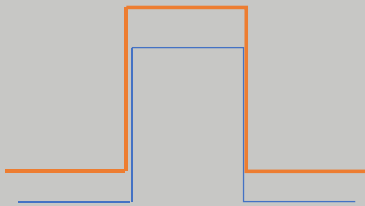
Xenon+Mechanical Shutter + LED



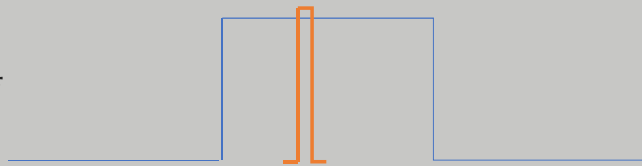
闪光灯的同步方式

Guide number = f-number \times distance iso100

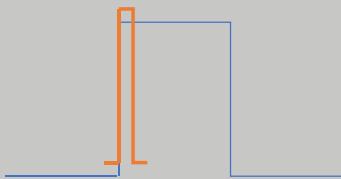
高速同步



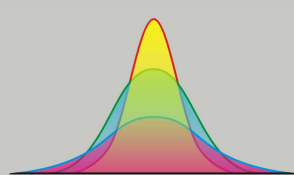
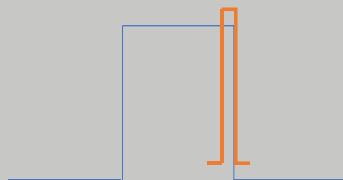
慢速同步



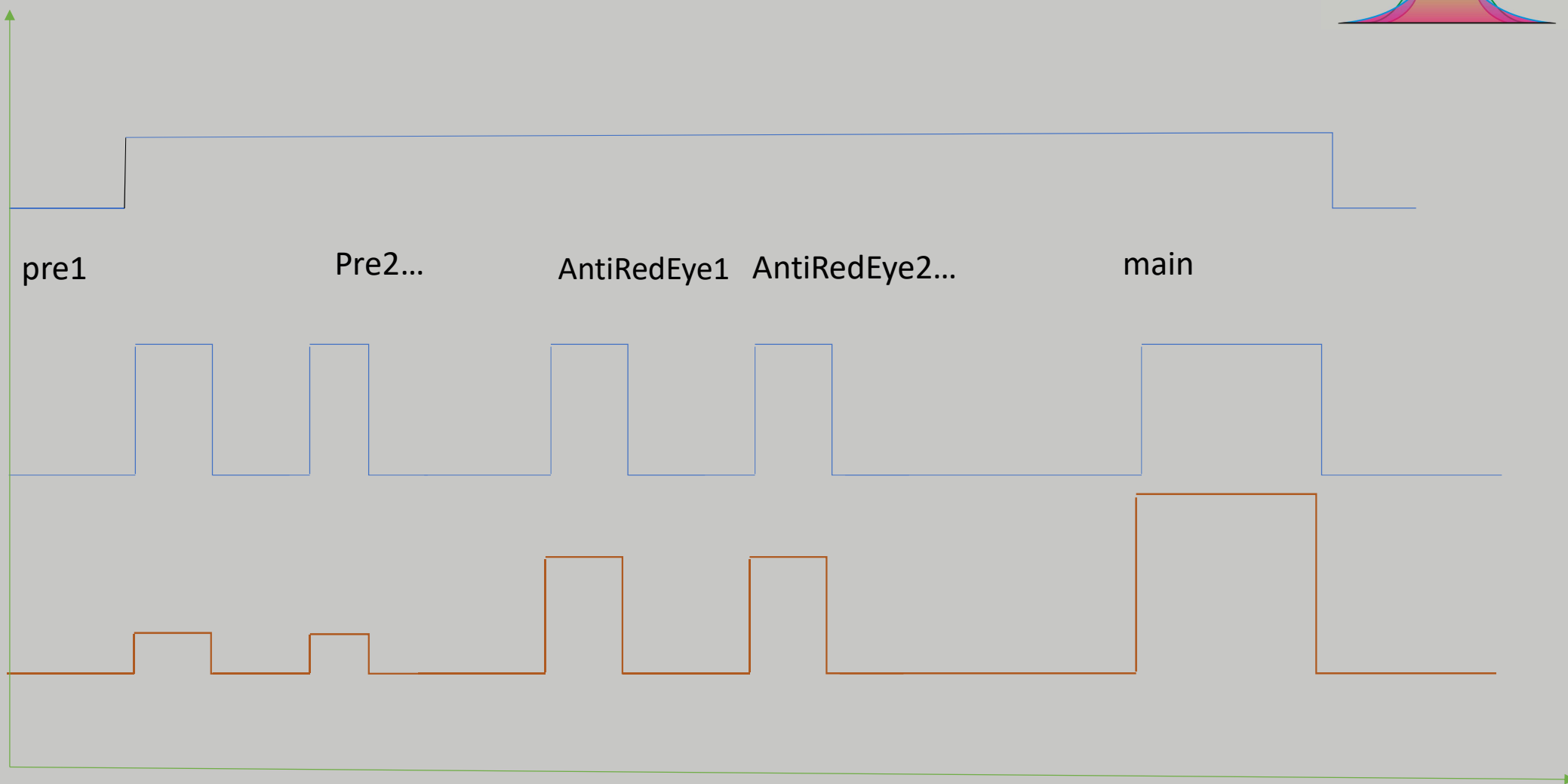
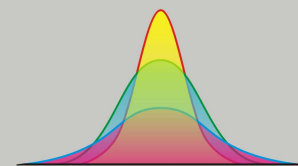
前帘同步



后帘同步



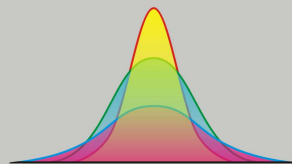
闪光灯的基本控制时序



为什么现在主流手机相机不采用氙灯

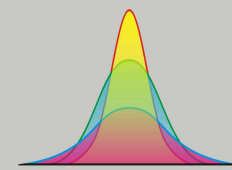
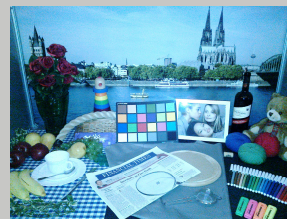
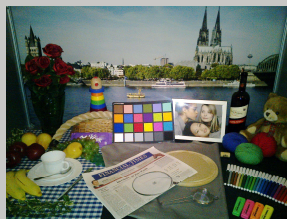
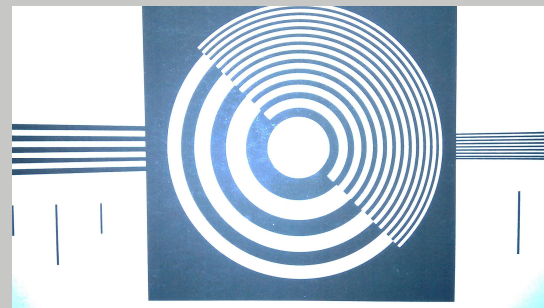
1. 耗电量大
2. 体积大，厚度厚
3. 需要配合机械快门+LED
4. EMC
5. 成本高

Xenon : Mechanical Shutter + LED



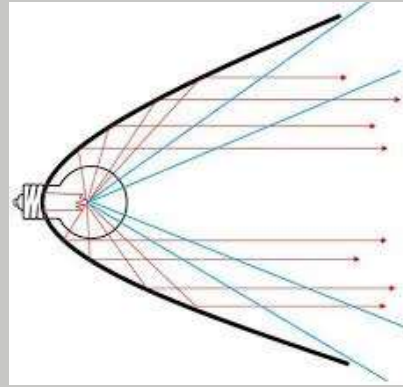
闪光灯照相的常见问题

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

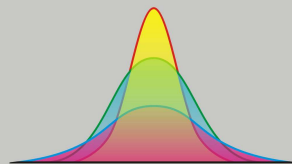
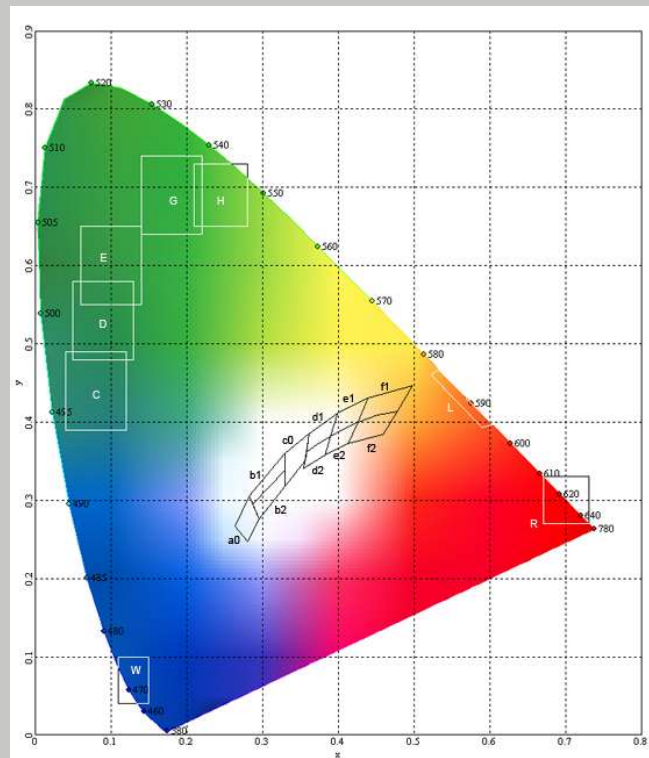


闪光灯的光学指标：

1. Relative Illuminance

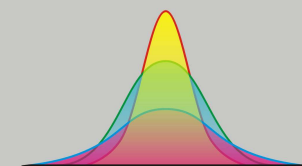


2. Chromaticity 一致性



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

1. 数字成像系统介绍
2. CMOS image sensor基础
3. 光学基础
4. 颜色科学基础
5. ISP 信号处理基础
6. 3A概述
7. 黑电平与线性化
8. Green Imbalance
9. 坏点消除
10. Vignetting与Color shading
11. SNR 与Raw Denoise
12. Dynamic Range与Tone Mapping
13. MTF与Demosaic
14. 色彩空间与色彩重建
15. Color Correction Matrix与3D LUT
16. Gamma与对比度增强
17. Sharpening
18. Color Space Conversion
19. 空域去噪
20. 时域去噪
21. Color Aberrance Correction and Depurple
22. ISP 的统计信息
23. 自动曝光
24. 自动白平衡
25. 自动对焦
26. 闪光灯
27. HDR
28. Exif 和DNG
29. Encoder
30. 图像防抖
31. 图像质量评价工具与方法
32. 画质调优

