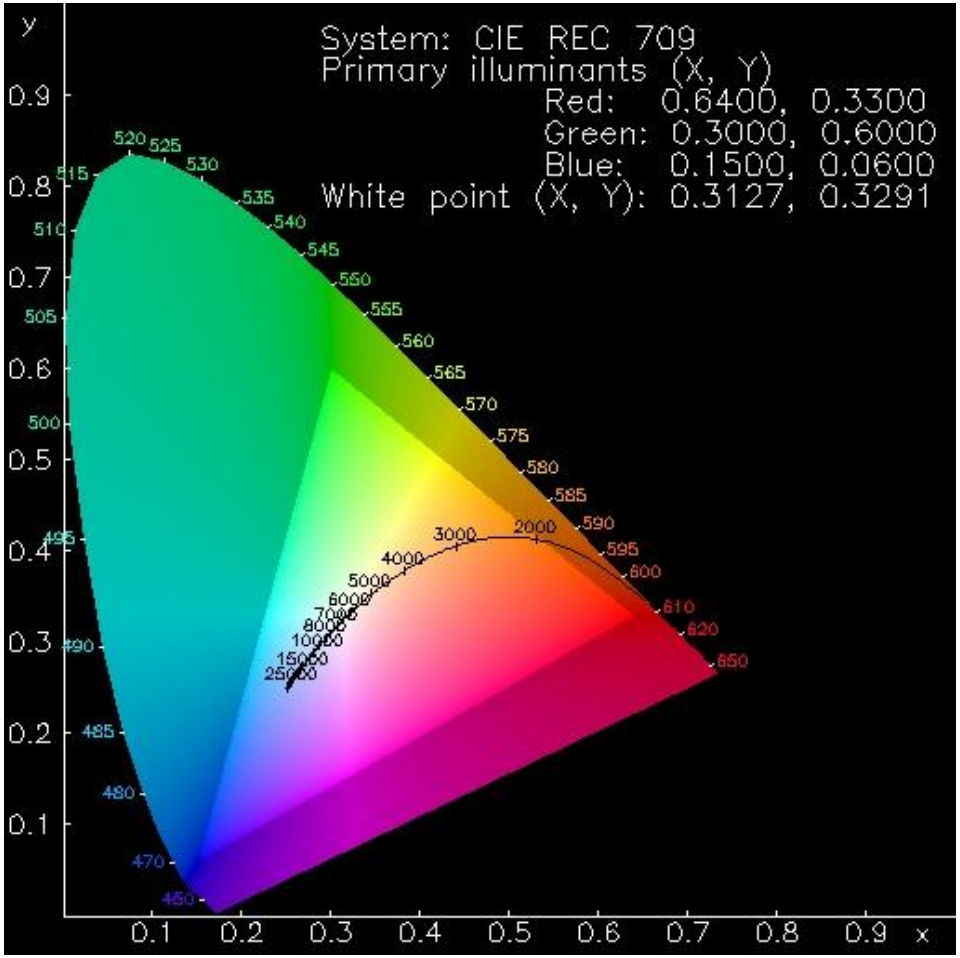
Spectral Projections

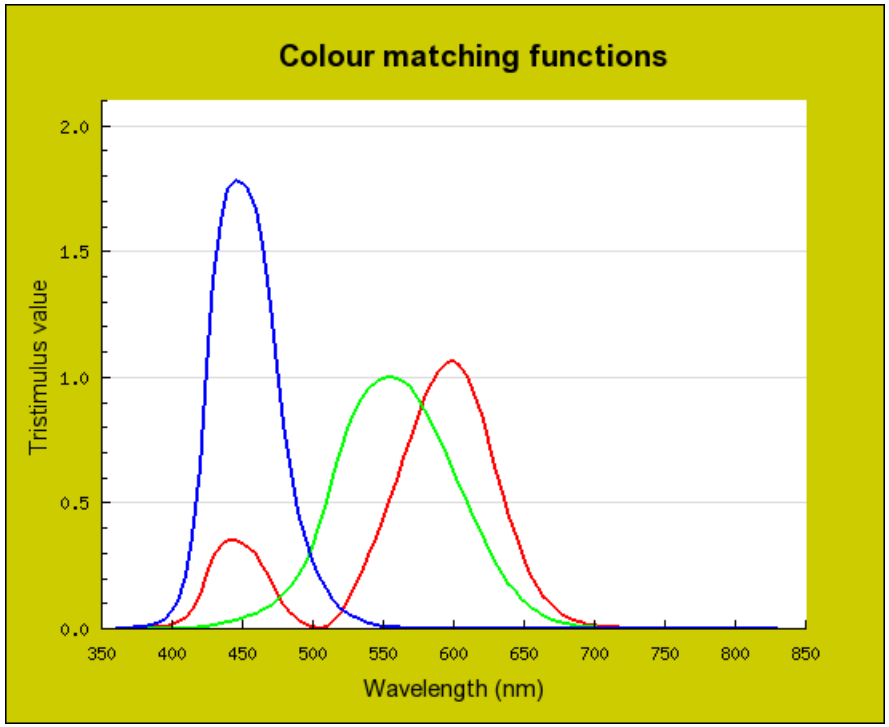
Eric & Adam’s Results

Wavelength to RGB

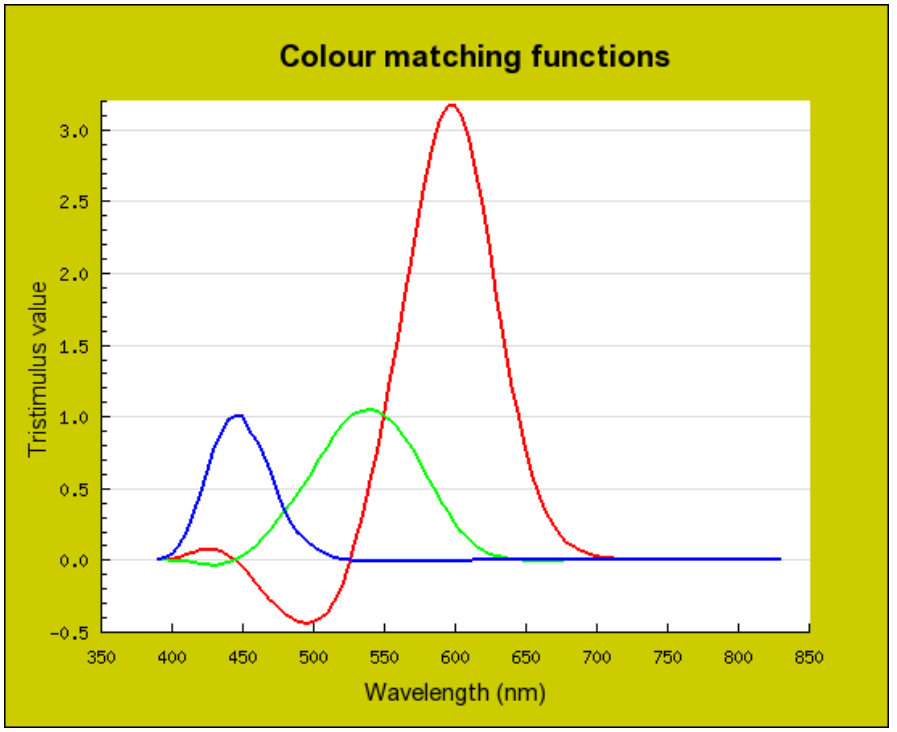


Color Matching Functions

CIE 1931 2-degree XYZ CMFs



Stiles & Burch 1955 2-degree RGB CMFs



Source: http://www-cvrl.ucsd.edu/cmfs.htm

XML File : Light Definition

White Light

```
<light>
    <type>beam</type>
    <wavelengths>380 825</wavelengths>
    <intensity>1.0</intensity>
    <direction>0 0 -1</direction>
    <position> 0 72 -115</position>
</light>
```

XML File : Light Definition

Hydrogen Light

```
<light>
    <type>beam</type>
    <wavelengths>410 410 434 434 486 486 650
    670</wavelengths>
    <intensity>1.0</intensity>
    <direction>0 0 -1</direction>
    <position> 2 72 -115</position>
</light>
```

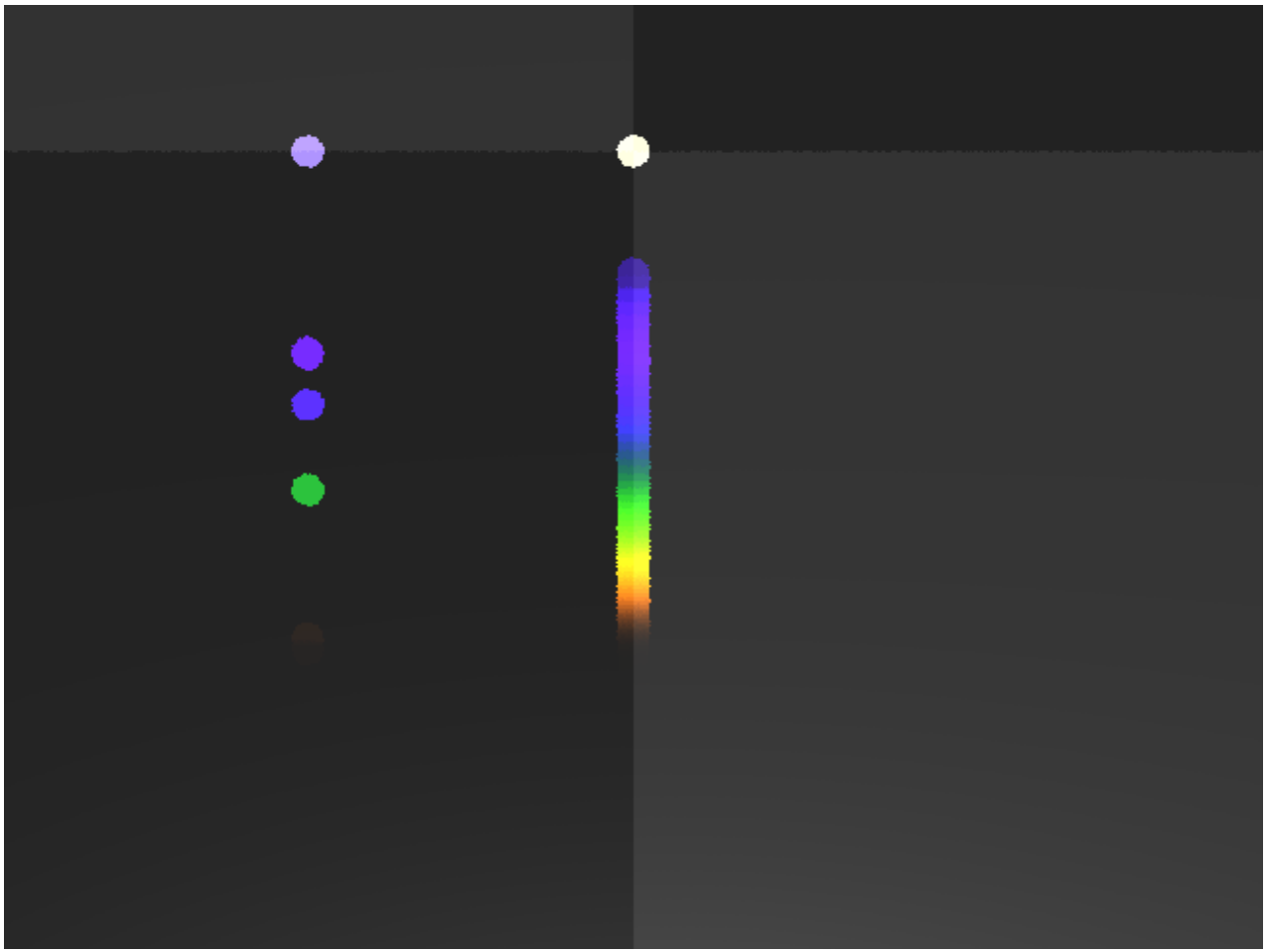
Scene Implementation

1. Light to Geometry
2. Camera to Geometry

(Quick Board Drawing)

Image Results

Using: CIE 1931 Color Definition Standard



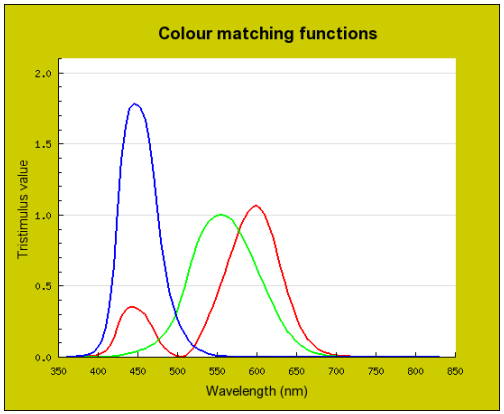
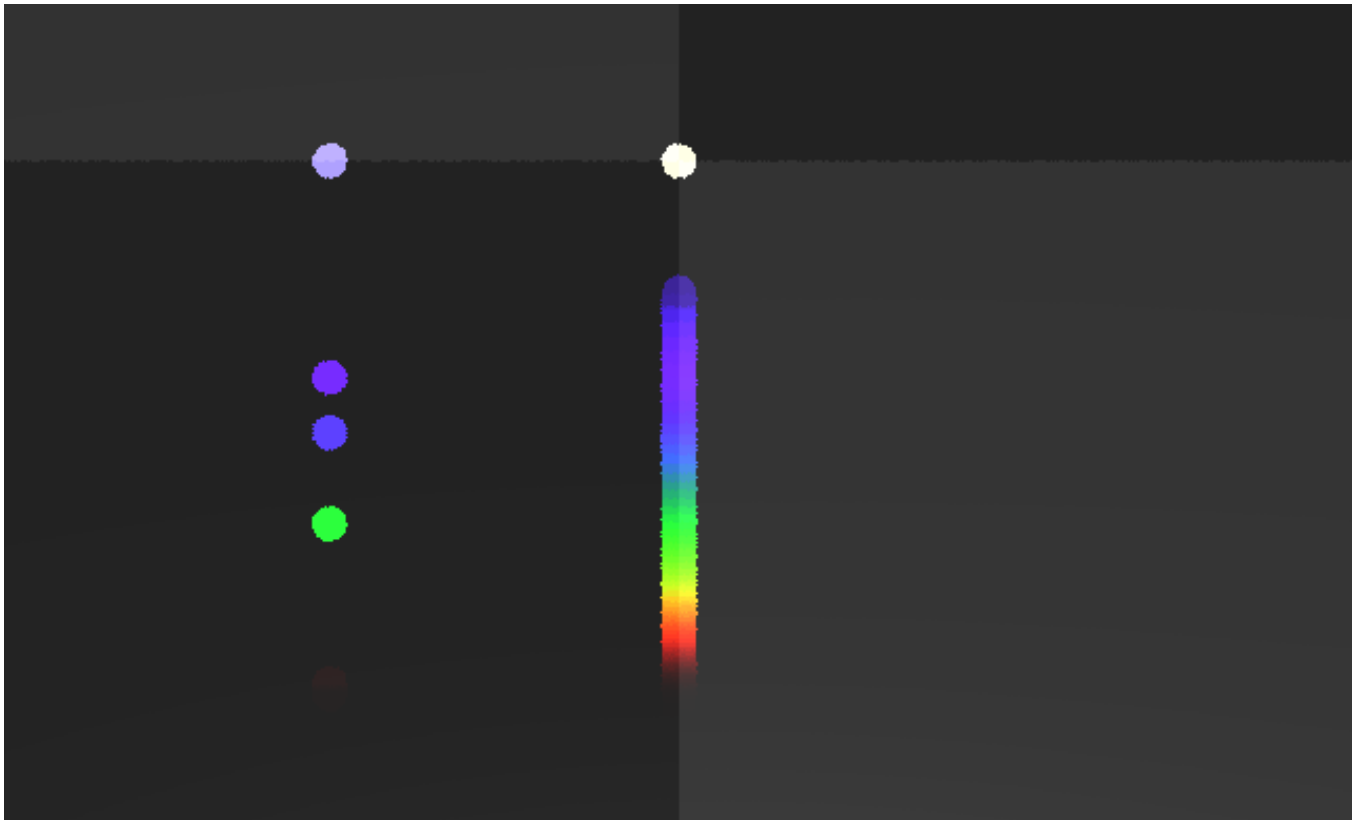
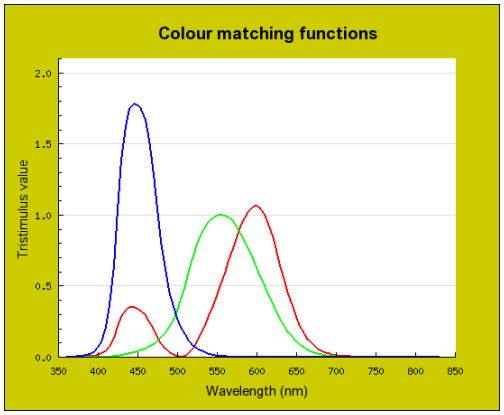
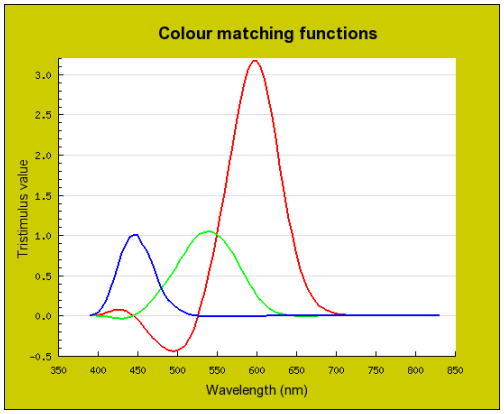


Image Results

Using: Eric's Hybrid between 1959 Stiles & Burch CMF & CIE 1931 CMF

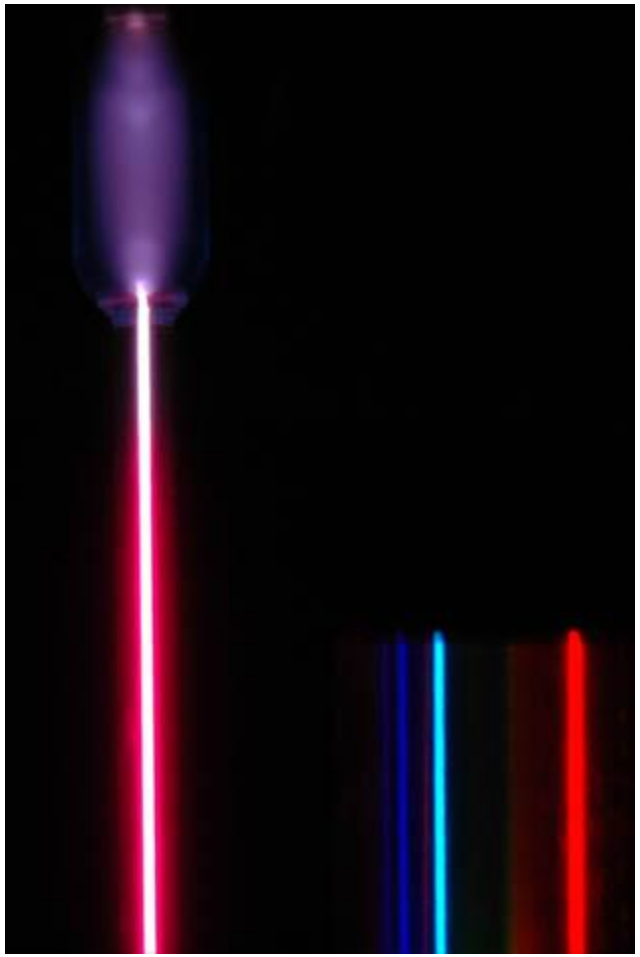


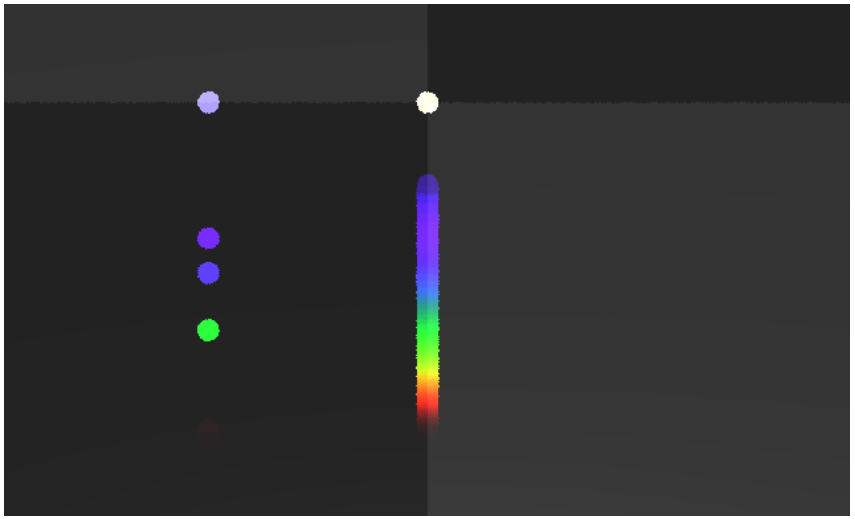




Changed: Green values from Stiles & Burch used in CIE 1931, starting at wavelength 450

Hydrogen Light Comparison

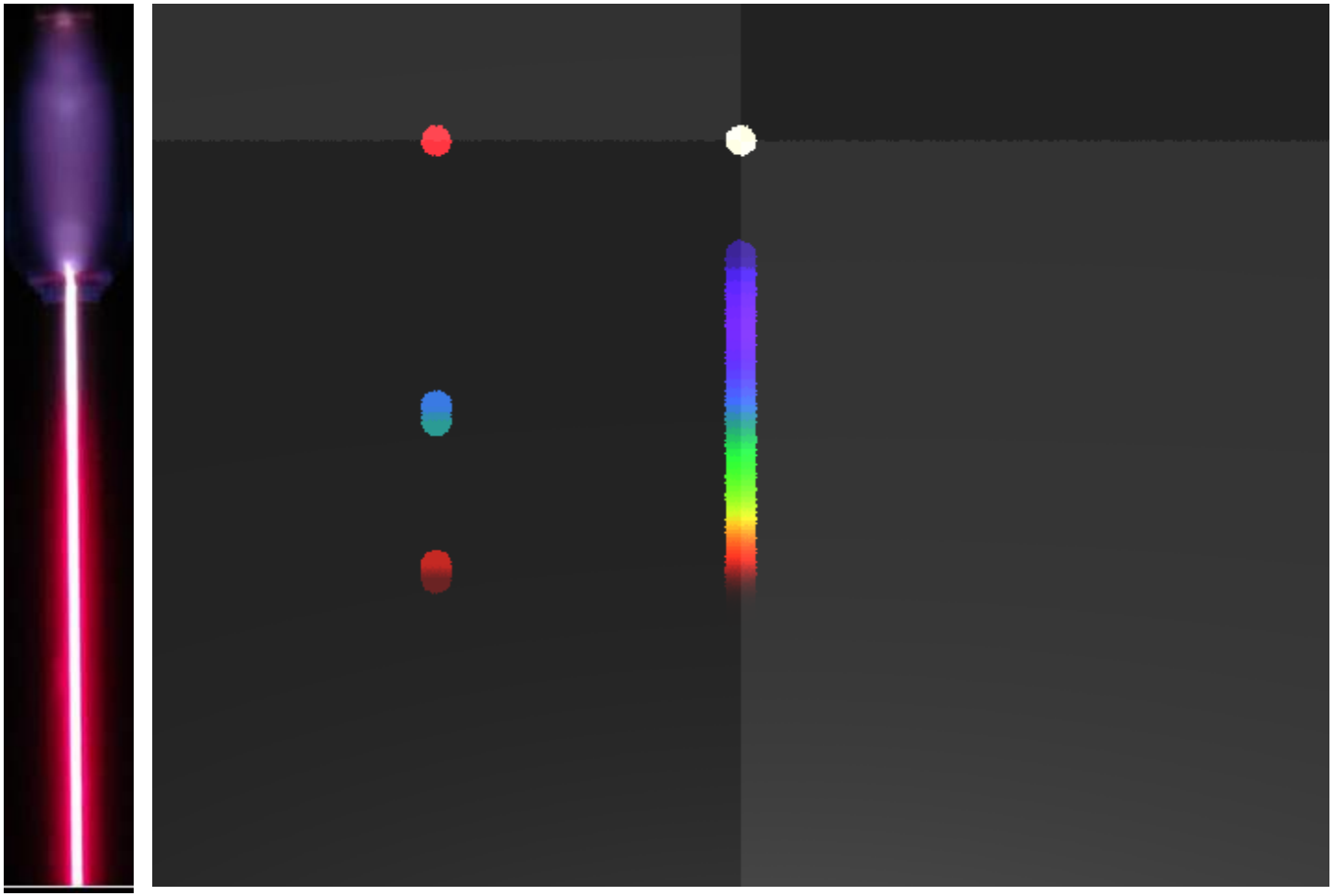




Inconsistencies:
-Hydrogen color bands have levels of intensity
-Red is very bright
-Maybe the source wavelengths are off by an offset?

Conclusion: Not scientifically accurate

Adjusted Wavelengths



Wavelengths: 450 -> 450, 600->610

Final Thoughts

- Super expensive to compute
- We've proven that it's possible to model lights with a sum of their wavelengths
- Light intensity should be defined for each wavelength (Possibly as a polynomial function)
- It's extremely hard to visualize scene layout by only looking at the XML file. Does the ray hit the prism correctly or is it a bug?