

# Outline of Week

WARNING!! Typo present in static 3d planet modeling code!!!

# Outline of Week

~~◆ Day 1: Movies!~~

~~◆ Day 2: More movies! Start thinking about 3D stuff~~

◆ Day 3: More 3D interactive movies/things, VR

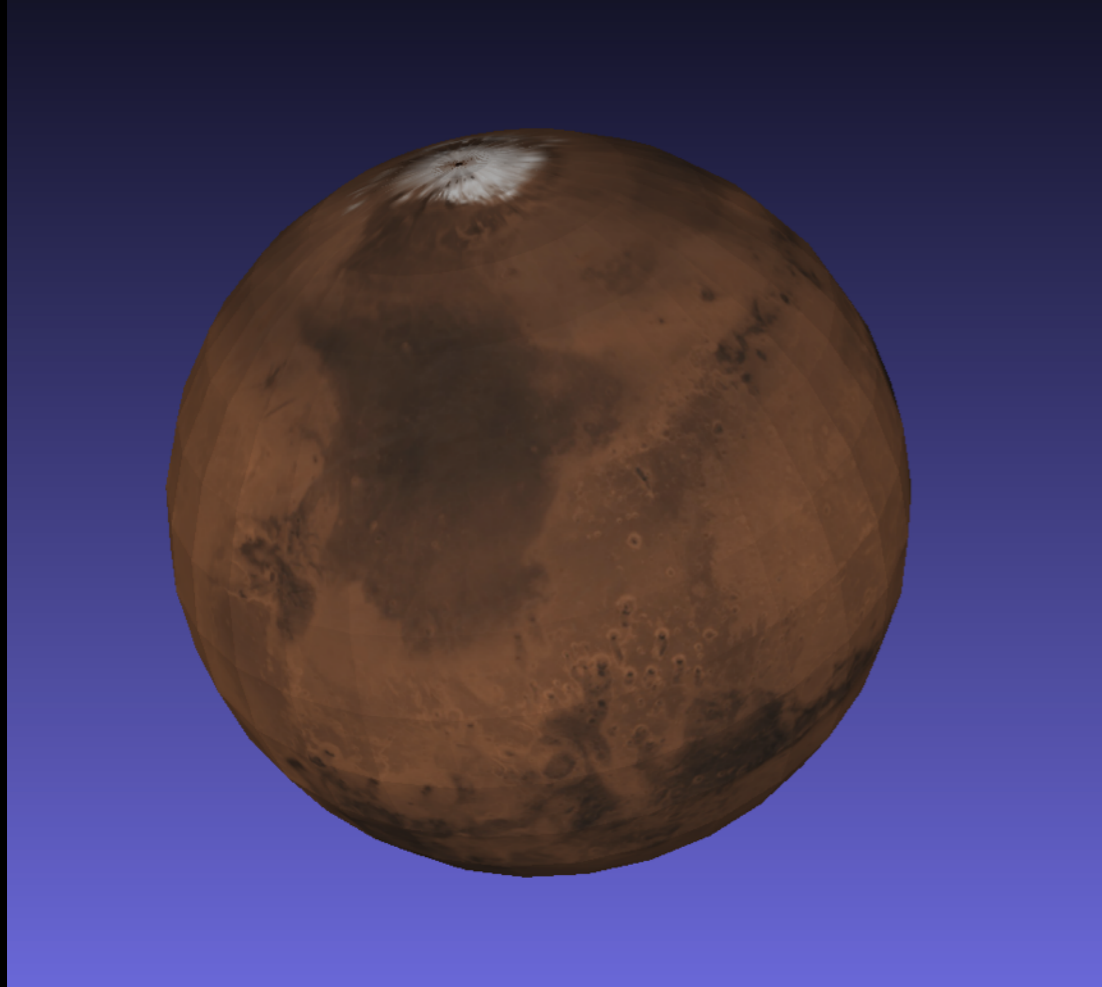
◆ Day 4: Glue/Hololense Demo and Gallery Exhibition

# Software

- (1) Set up a Sketchfab account
- (2) Download MeshLab

# The OBJ File Format

```
Jills-MacBook-Pro:MyPlanetSystem jillnaiman1$ ls  
MyPlanetSystem.mtl  green_sun.jpg      neptunemap_1000.jpg  
MyPlanetSystem.obj  jupiter_1200.jpg  sun_texture1.jpg
```



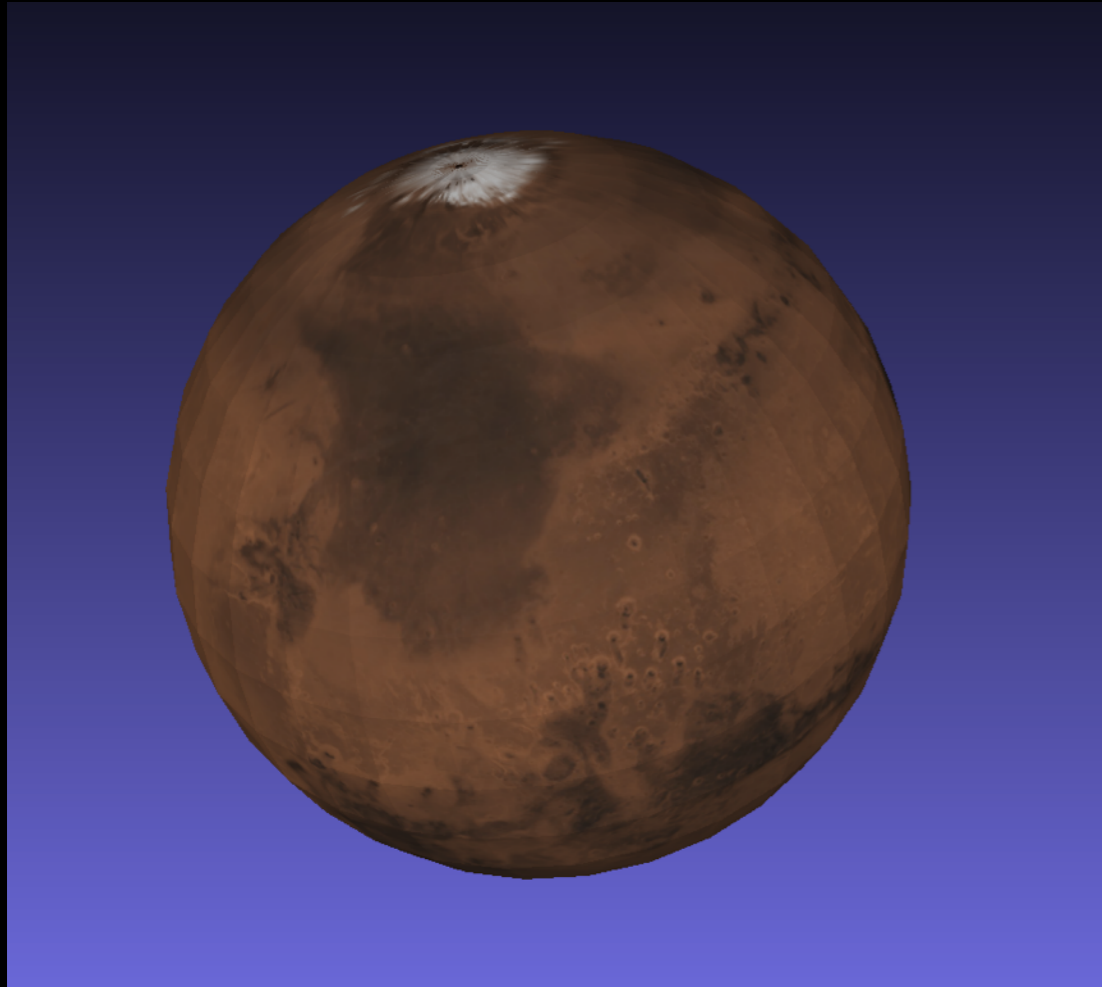
# The OBJ File Format

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MyPlanetSystem.mtl  green_sun.jpg      neptunemap_1000.jpg
MyPlanetSystem.obj  jupiter_1200.jpg  sun_texture1.jpg
```

For each object (sphere) an OBJ file gives information for:

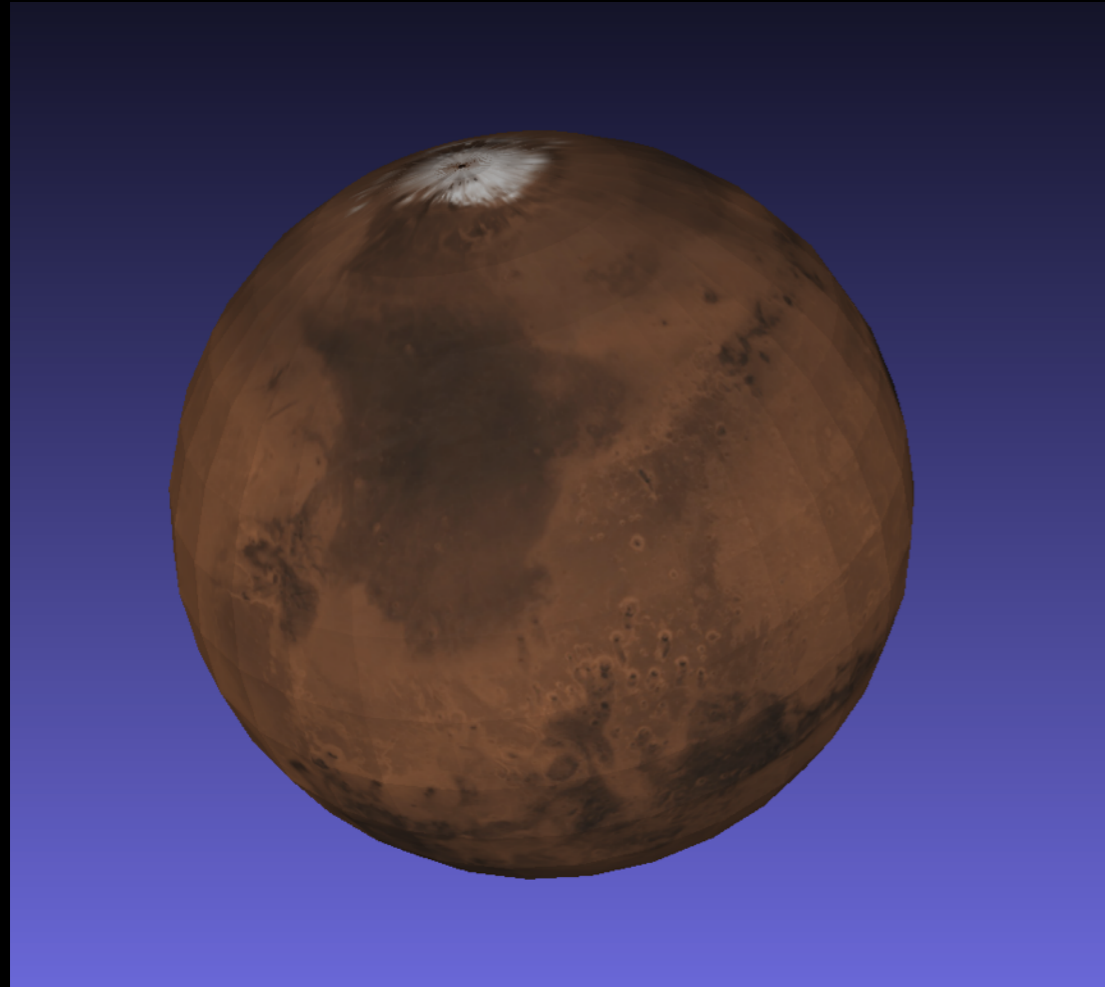
Vertex locations

Texture coordinates



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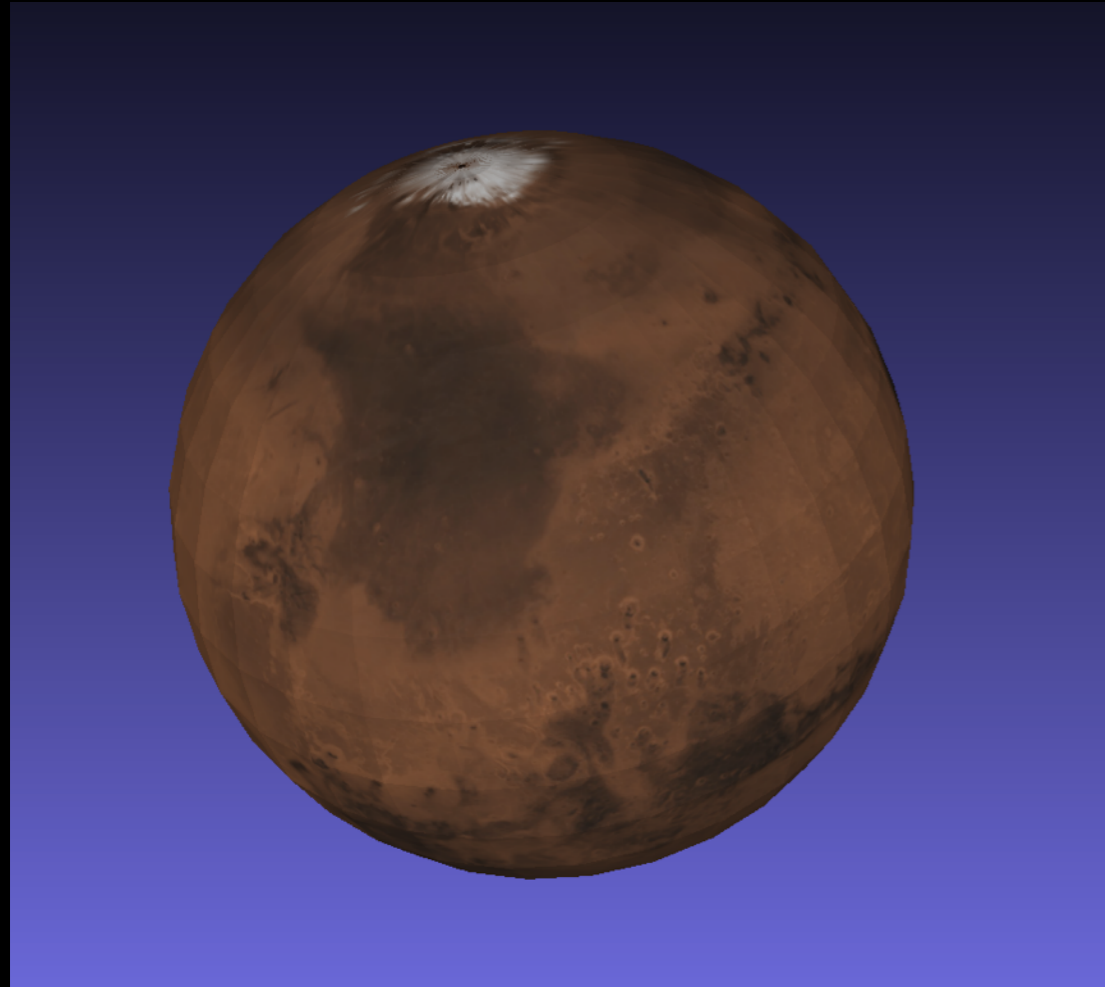
Companion material file (.mtl file) gives information for:

Colors of faces

Names of mapped textures

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For each object (sphere) an OBJ file gives information for:

Vertex locations

Texture coordinates

Companion material file (.mtl file) gives information for:

Colors of faces

Names of mapped textures

NOTE: these sorts of files can be uploaded in MeshLab & Sketchfab

For Sketchfab you must zip together the .obj, .mtl, and texture files

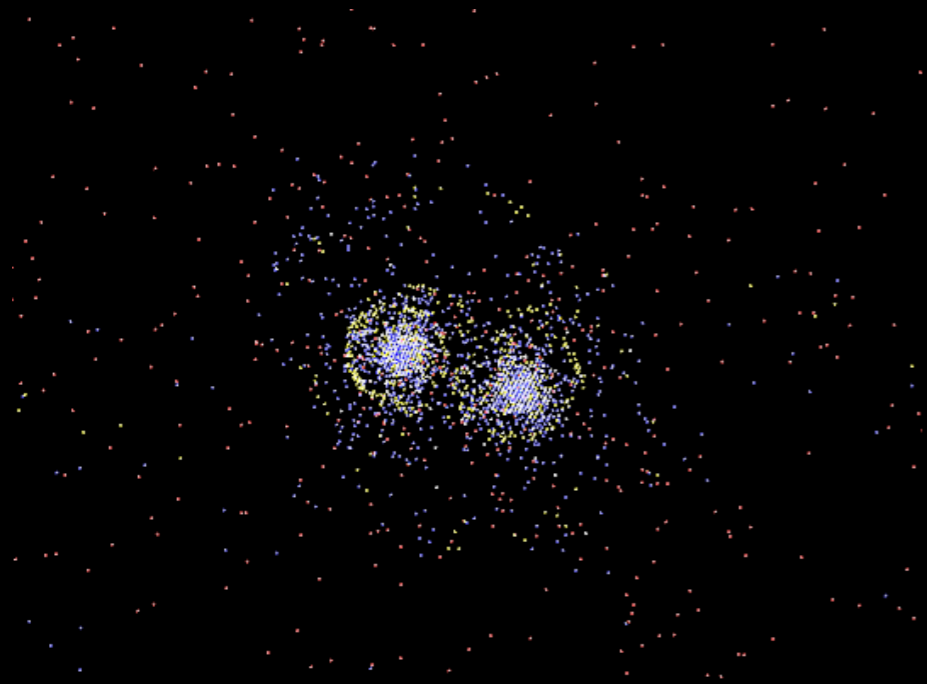
For MeshLab: select Render -> Color -> Per Mesh to see textures

# The PLY File Format

For each vertex representing each particle, the PLY file stores:

Vertex locations

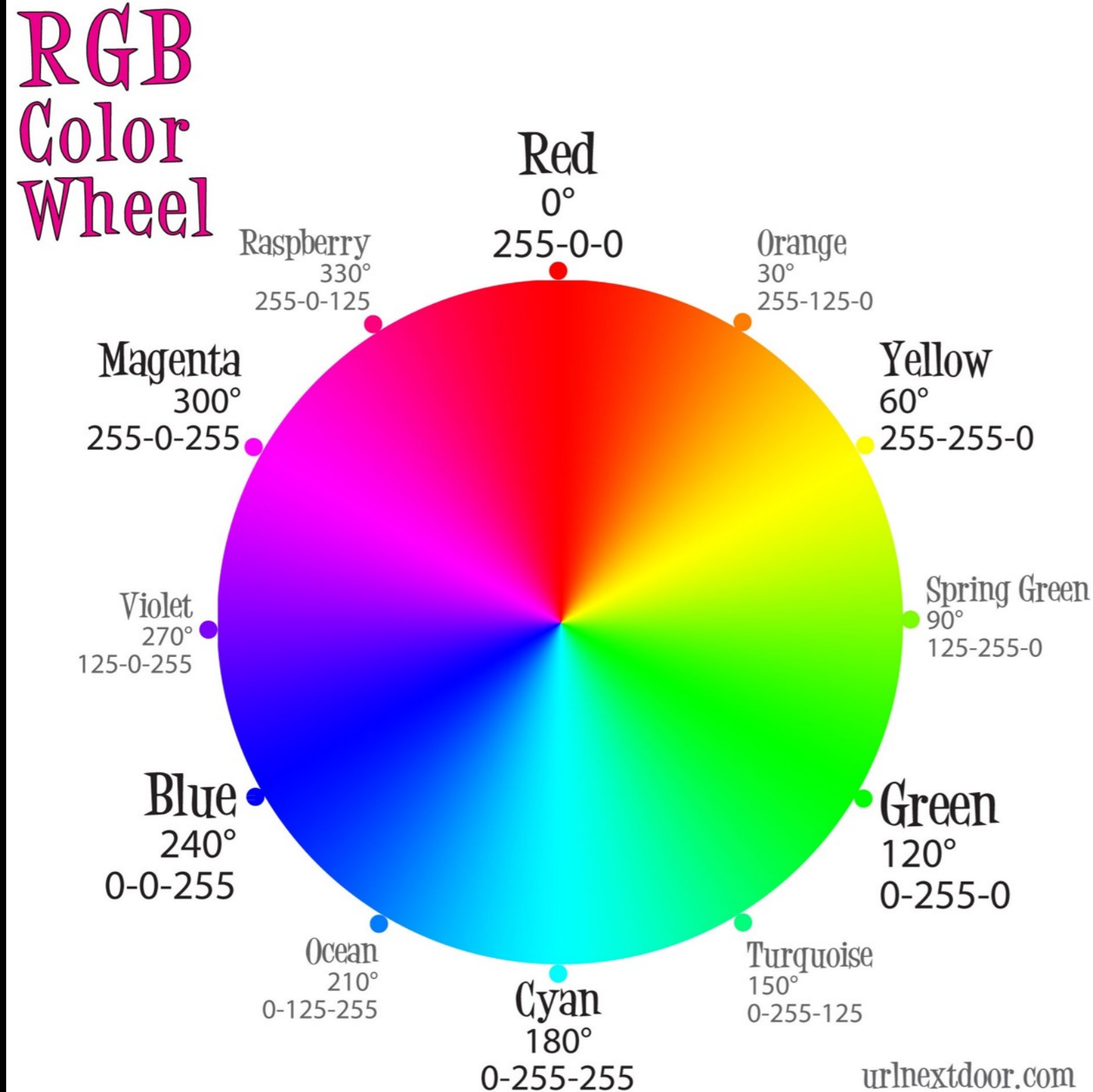
Colors of each vertex



NOTE: these sorts of files can be uploaded Sketchfab only



# A note about RGB colors



Some code the range is 0-255, others its 0-1... sorry

# First, start with static uploads

Hints for Sketchfab (esp for PLY files):

Sketchfab EXPLORE COMMUNITY BLOG Search UPLOAD

**This model is a draft**  
Only you can see this model. If you are happy with the result, you can publish it. You can also improve the result by fixing some minor issues: [See issues](#)

EDIT 3D SETTINGS PUBLISH ANYWAY

## Big Galaxy

by **jnaiman** PRO  
VIEW PROFILE

ABOUT THIS MODEL

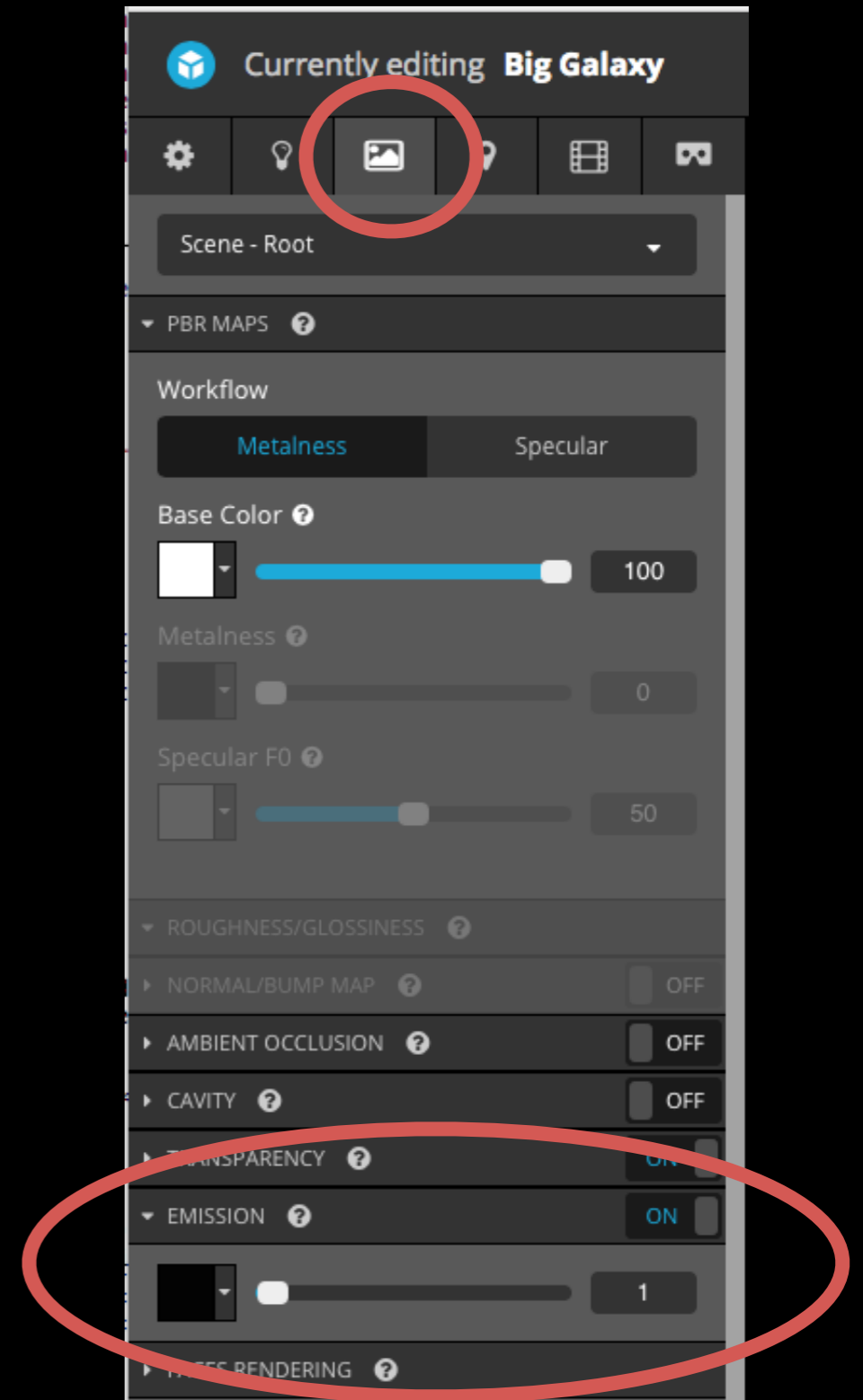
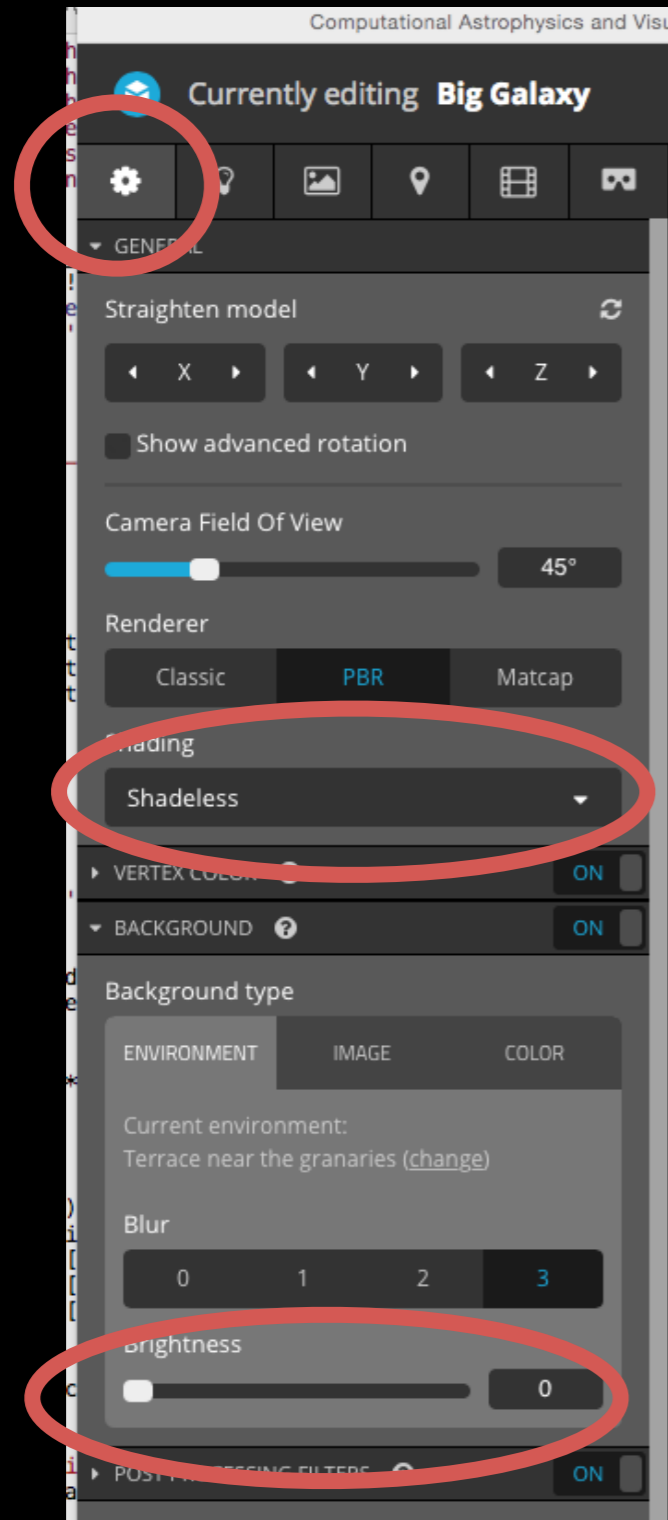
- 0 faces
- 5.4k vertices

SETTINGS

Click on 3D settings

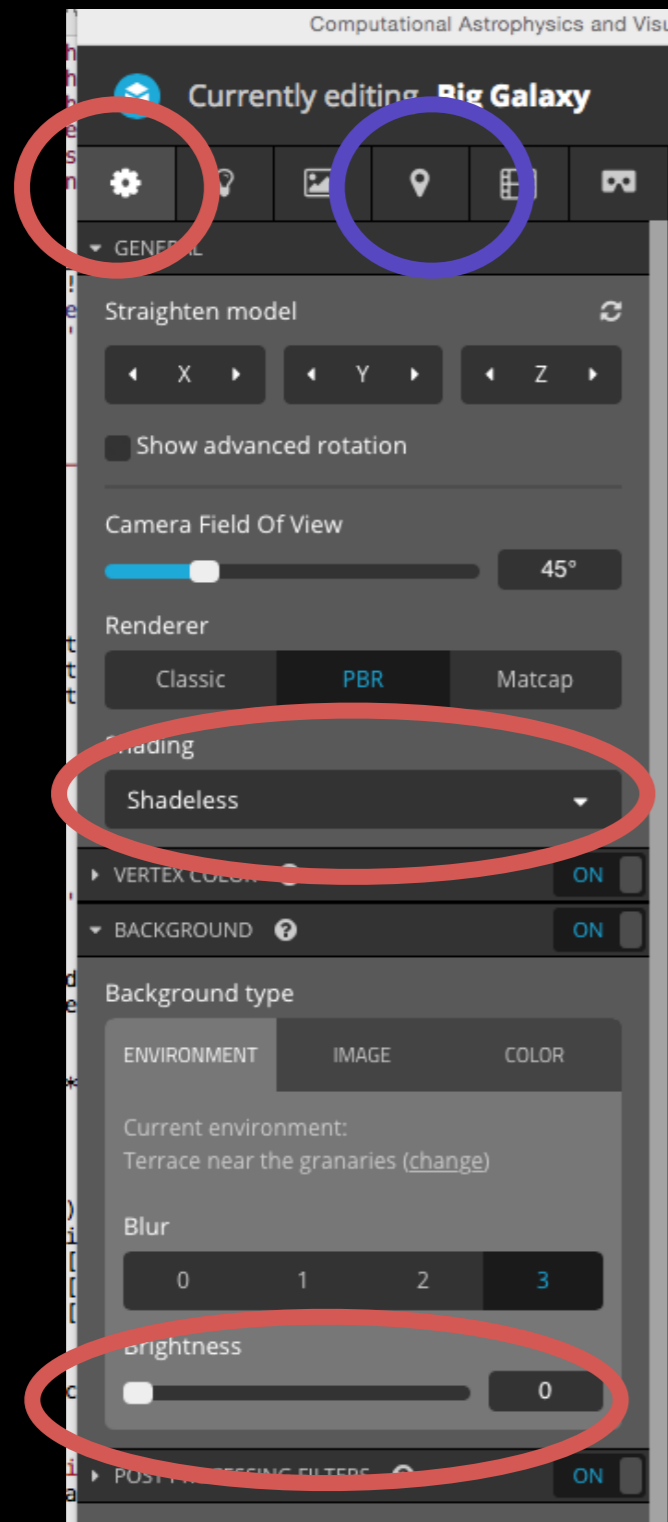
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Hints for Sketchfab (esp for PLY files):

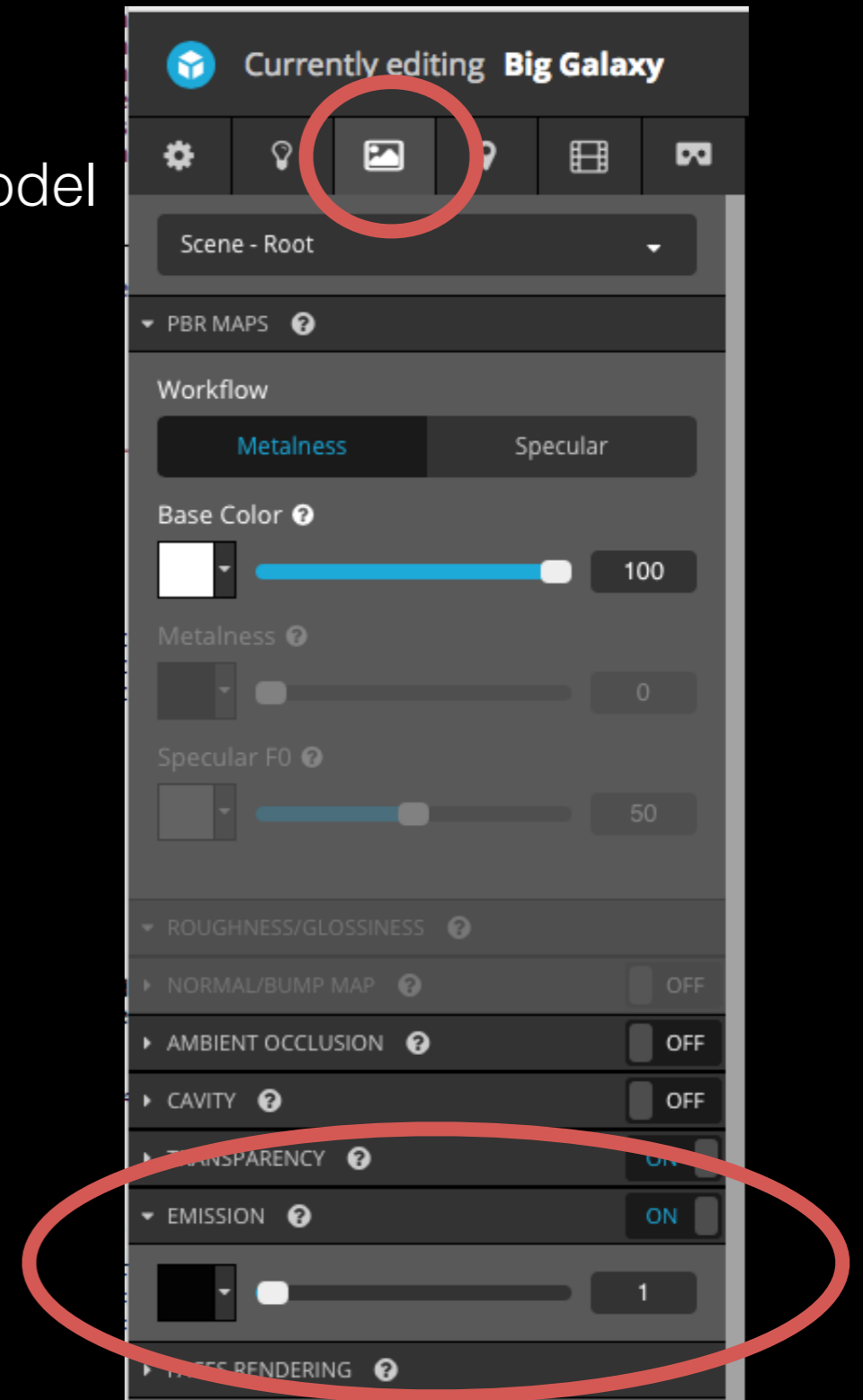


# First, start with static uploads

Hints for Sketchfab (esp for PLY files):



Annotations to your model



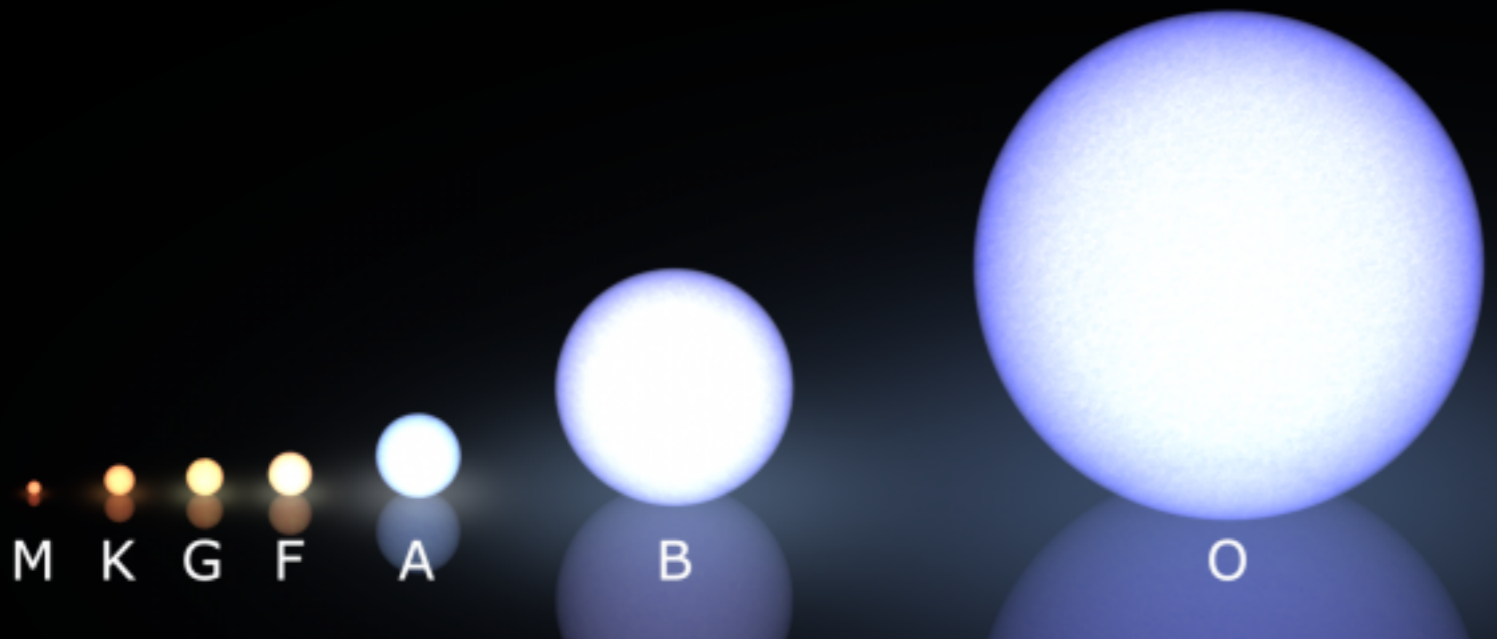
# The OBJ File Format - Planets

Extra things to consider for stars in planet viz's:

<u>Main Sequence Stars</u>							
	O	B	A	F	G	K	M
Spectral Type:	O	B	A	F	G	K	M
Temperature:	40 000K	20 000K	8500K	6500K	5700K	4500K	3200K
Radius (Sun=1):	10	5	1.7	1.3	1.0	0.8	0.3
Mass (Sun=1):	50	10	2.0	1.5	1.0	0.7	0.2
Luminosity (Sun=1):	100 000	1000	20	4	1.0	0.2	0.01
Lifetime (million yrs):	10	100	1000	3000	10 000	50 000	200 000
Abundance:	0.00001%	0.1%	0.7%	2%	3.5%	8%	80%

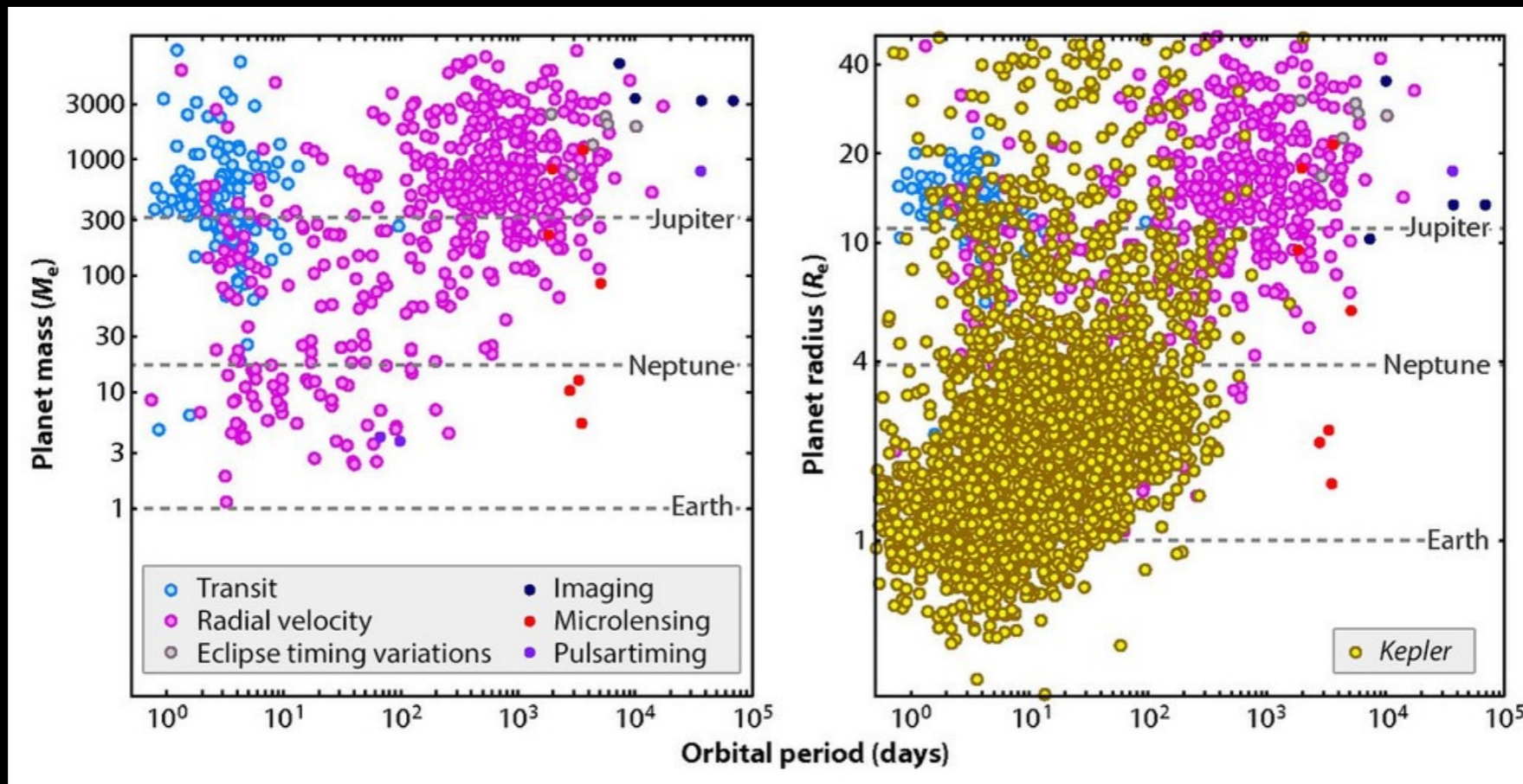
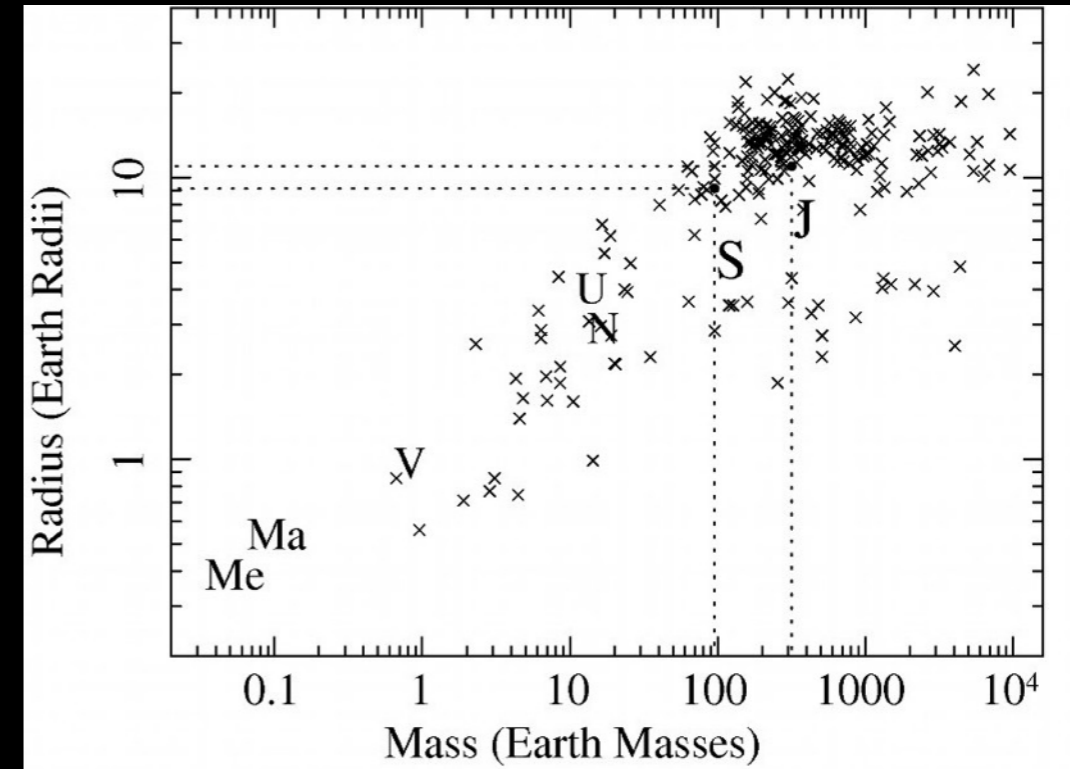
  

<u>Giant Stars</u>	<u>White Dwarfs</u>	<u>Supergiant Stars</u>
Low mass stars near the end of their lives.	Dying remnant of an imploded star.	High mass stars near the end of their lives.
Spectral Type: Mainly G, K or M	Spectral Type: D	Spectral Type: O, B, A, F, G, K or M
Temperature: 3000 to 10 000K	Temperature: Under 80 000K	Temperature: 4000 to 40 000K
Radius (Sun=1): 10 to 50	Radius (Sun=1): Under 0.01	Radius (Sun=1): 30 to 500
Mass (Sun=1): 1 to 5	Mass (Sun=1): Under 1.4	Mass (Sun=1): 10 to 70
Luminosity (Sun=1): 50 to 1000	Luminosity (Sun=1): Under 0.01	Luminosity (Sun=1): 30 000 to 1000 000
Lifetime (million yrs): 1000	Lifetime (million yrs): -	Lifetime (million yrs): 10
Abundance: 0.4%	Abundance: 5%	Abundance: 0.0001%



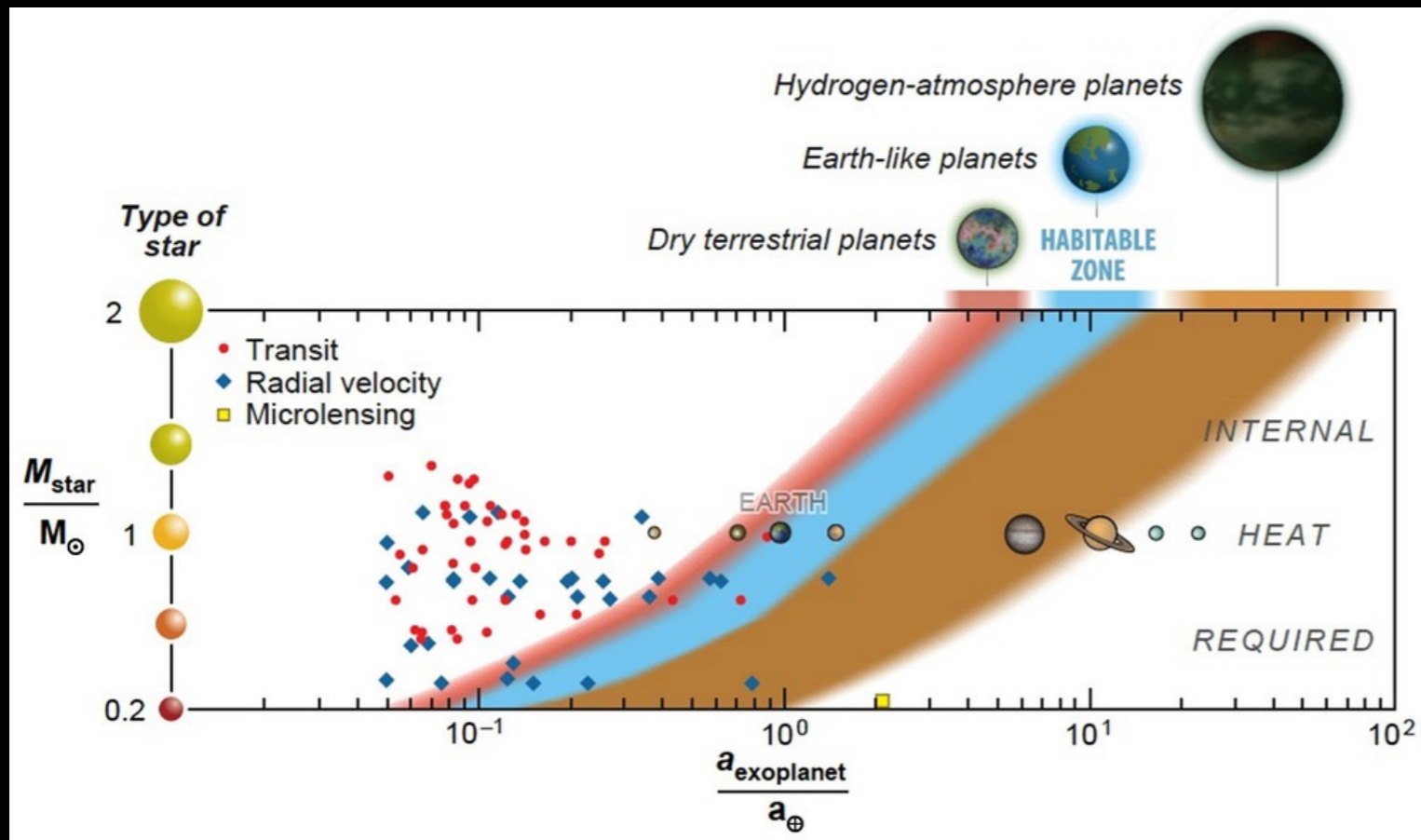
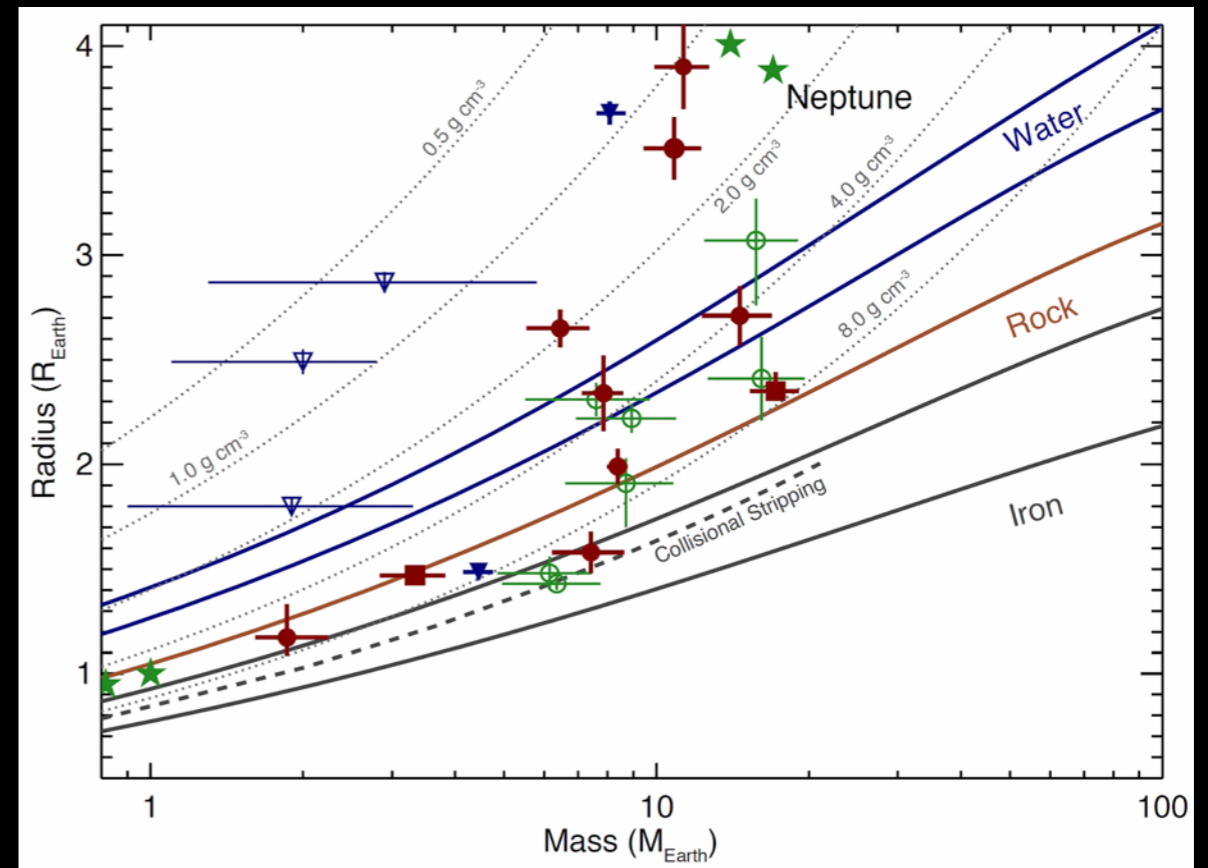
# The OBJ File Format - Planets

Extra things to consider for planets in planet viz's: Mass-Radius



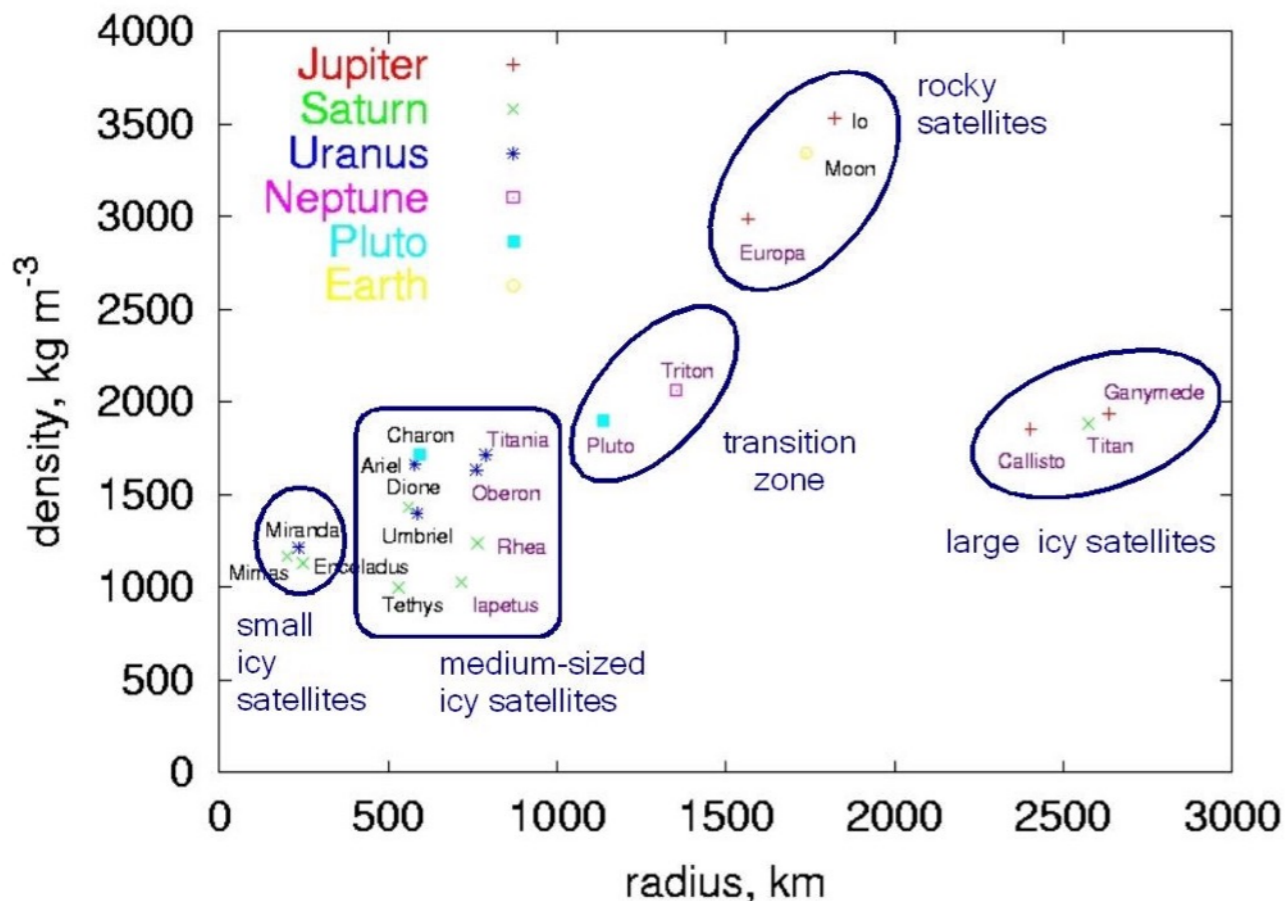
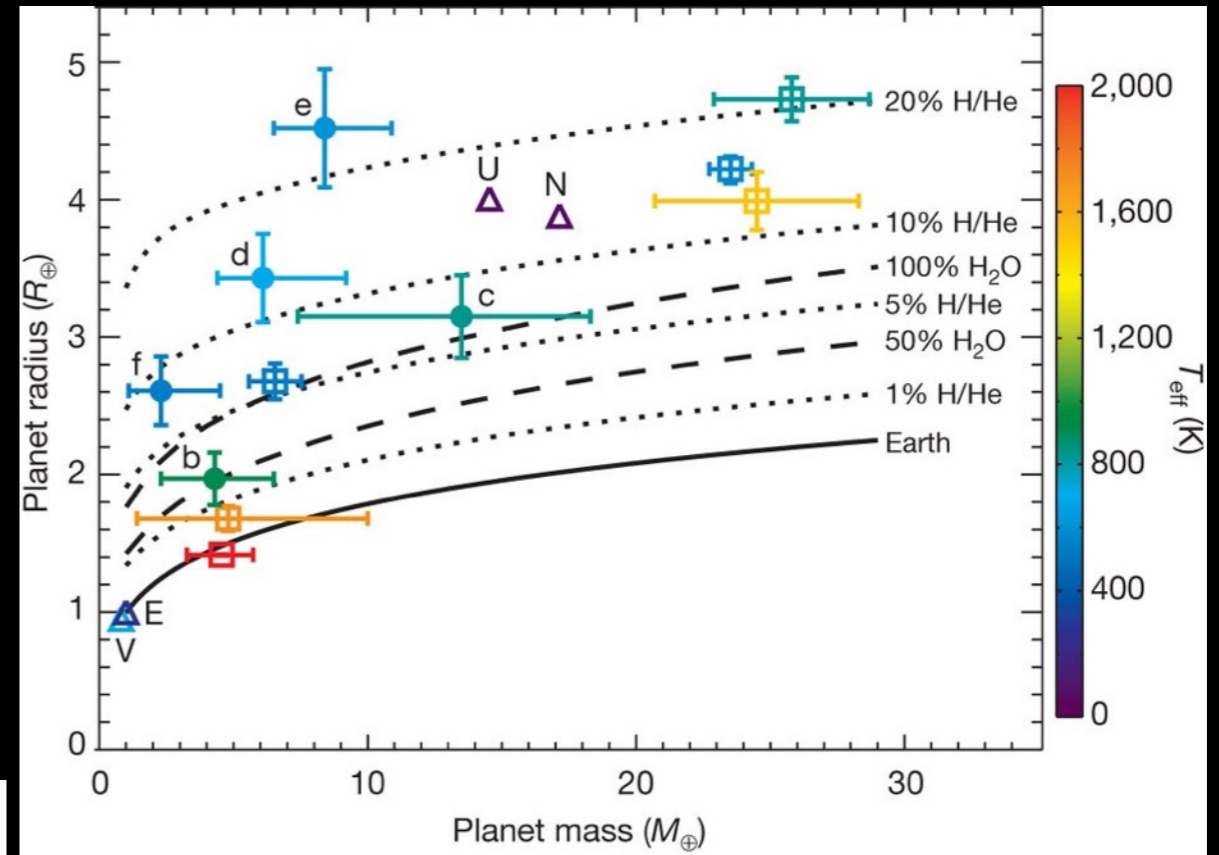
# The OBJ File Format - Planets

Extra things to consider for planets in planet viz's: Composition



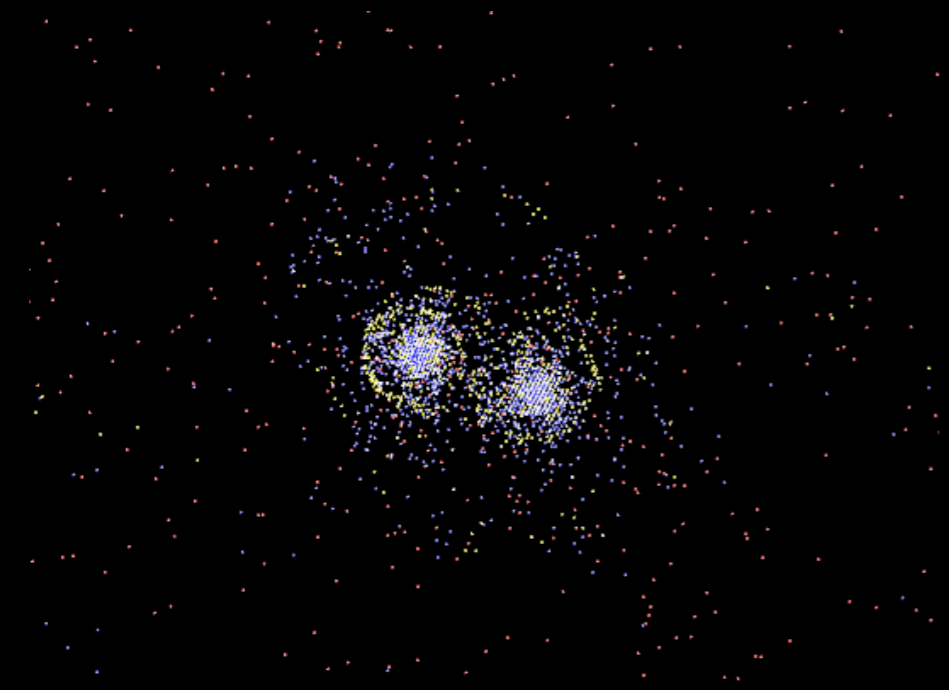
# The OBJ File Format - Planets

Extra things to consider for planets in planet viz's:





# The PLY File Format - Galaxies



What should each particle color be? Why? Can it change based on the time of the snapshot? Which particles are useful to see, which aren't?

# 3D Interactive Movies! Hurray!

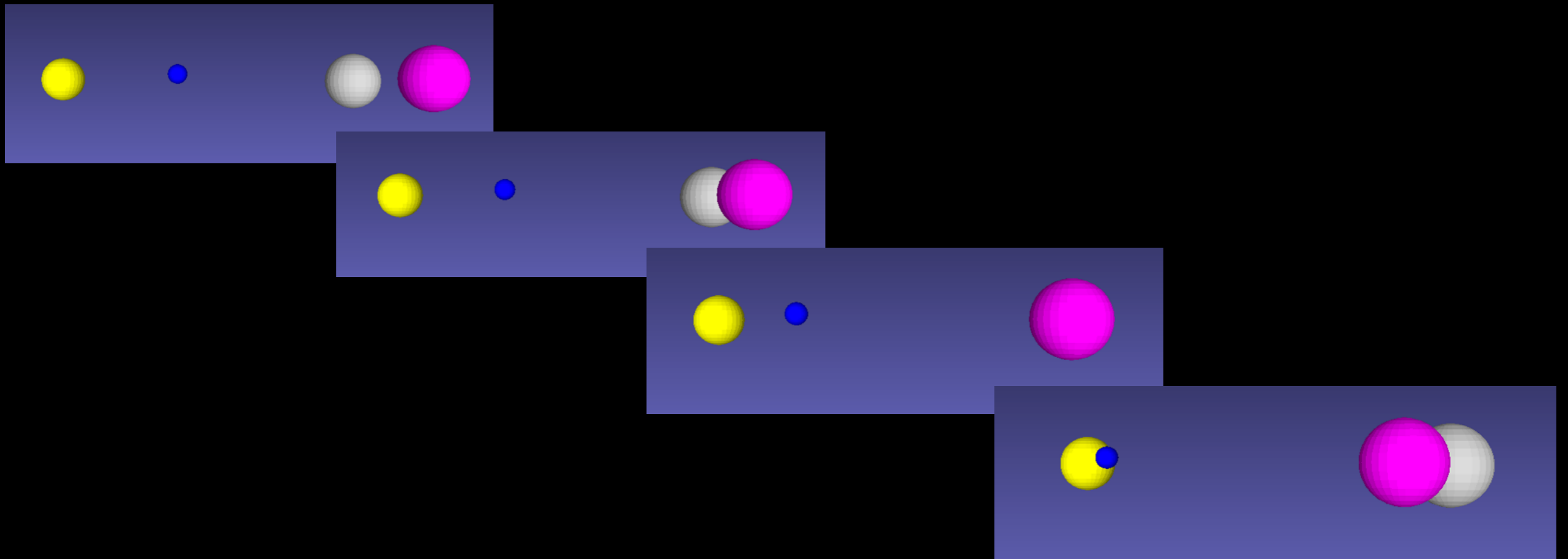


Essentially we are doing stop motion animation... but interactively and in 3D

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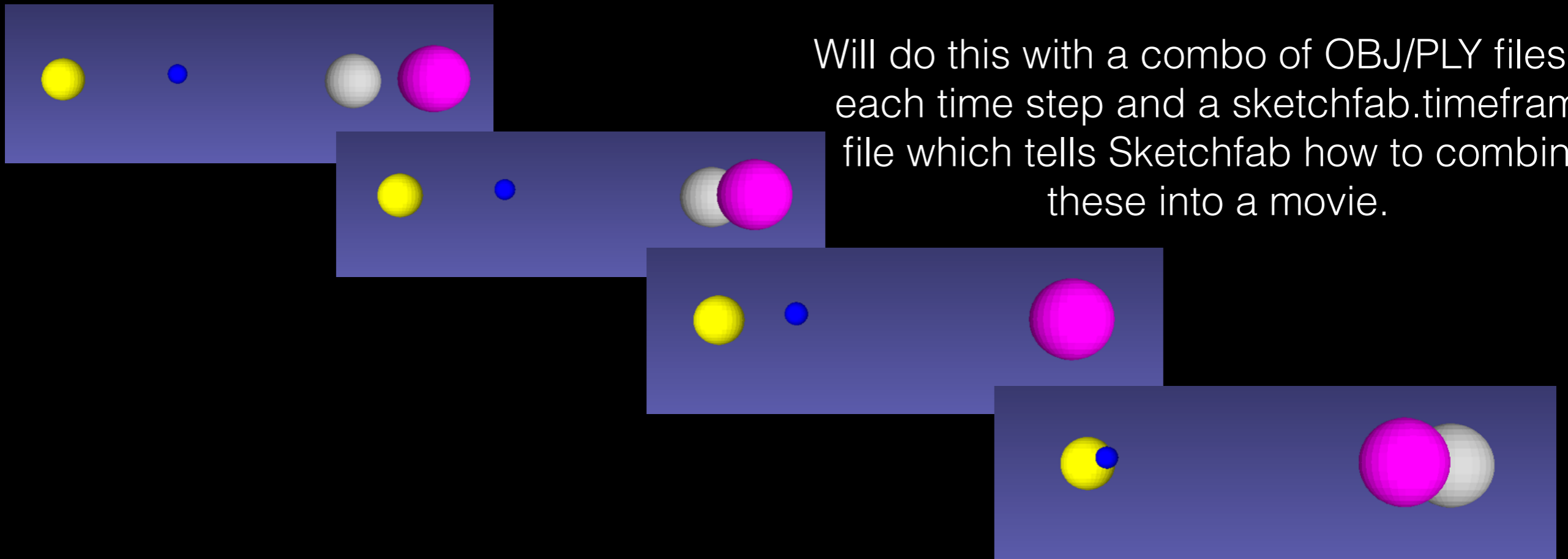
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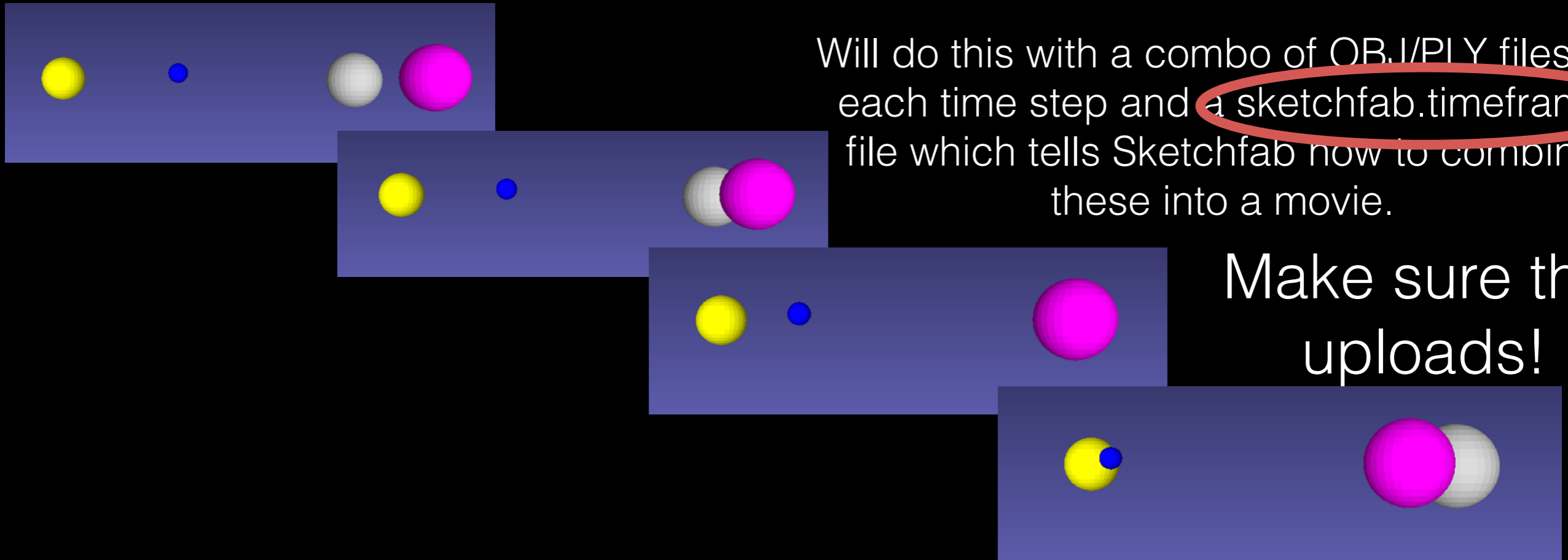


Will do this with a combo of OBJ/PLY files for each time step and a sketchfab.timeframe file which tells Sketchfab how to combine these into a movie.

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Make sure this uploads!

# 3D Interactive Movies! Hurray!

Before diving into the website, some things to consider:

What sort of story do you want to tell about your system?

How well your simulation is capturing this system?

Do you want to compare two or more systems?

Feel free to use a combination of 2D plots (trajectories, energy...) and 3D plots.

## Some tips and tricks:

Start with outputting not that many OBJ/PLY files so you can test more quickly on Sketchfab

Start with initially large dt\_movie's so that the movies go slowly so you can debug them

Compare 2D movies with 3D movies as a sanity check (how typos are found! :) )

