

1 Characterizing Exoplanets: TA Cheat Sheet

There are two ways to do this lab. You could assign the various groups different planets so that every one of them is analyzed. If you have six groups, you can then have duplicates to provide backup checking. Then they can shout out their predictions and you can show them the images. Or they can select the planets at random and follow the lab manual.

1. Transiting exoplanet #1 is a Neptune-mass planet that has a moderate density. It could be a Cthoninan, or a super-Earth, around a solar twin.
2. Transiting exoplanet #2 is a super-Jupiter, Mars-ish distance, but around a low mass K dwarf star.
3. Transiting exoplanet #3 is a Hot Jupiter, made hotter by orbiting a late F-type star.
4. Transiting exoplanet #4 is an exo-Earth orbiting around a solar twin.
5. Transiting exoplanet #5 is a super-Earth around a lower mass star.
6. Transiting exoplanet #6 is an exo-Neptune orbiting a solar twin.
7. Transiting exoplanet #7 is a water planet orbiting a lower mass star.
8. Transiting exoplanet #8 is a Cnthonian/super-Earth that is very close-in, but not super hot due to the M-dwarf primary star. This is also a special planet with a ring and a moon!

Table 1: Exoplanet Data

Object	$\Delta F/F$	Mass (kg)	Radius (m)	Density (kg m ⁻³)	Semi-major axis (m)	Temperature (K)
#1	0.00132	1.9×10^{26}	2.5×10^7	2900	9.0×10^9	1130
#2	0.0962	1.9×10^{28}	1.4×10^8	1650	3.0×10^{11}	126
#3	0.0181	5.7×10^{27}	9.9×10^7	1400	7.5×10^9	1367
#4	0.0000877	6.0×10^{24}	6.4×10^6	5500	1.5×10^{11}	276
#5	0.000226	1.5×10^{25}	8.8×10^6	5200	7.5×10^{11}	312
#6	0.00505	8.0×10^{26}	5.0×10^7	1530	3.0×10^{11}	195
#7	0.000264	4.0×10^{24}	6.5×10^6	1940	1.0×10^{11}	229
#8	0.00153	5.5×10^{25}	1.6×10^7	6000	9.0×10^9	554

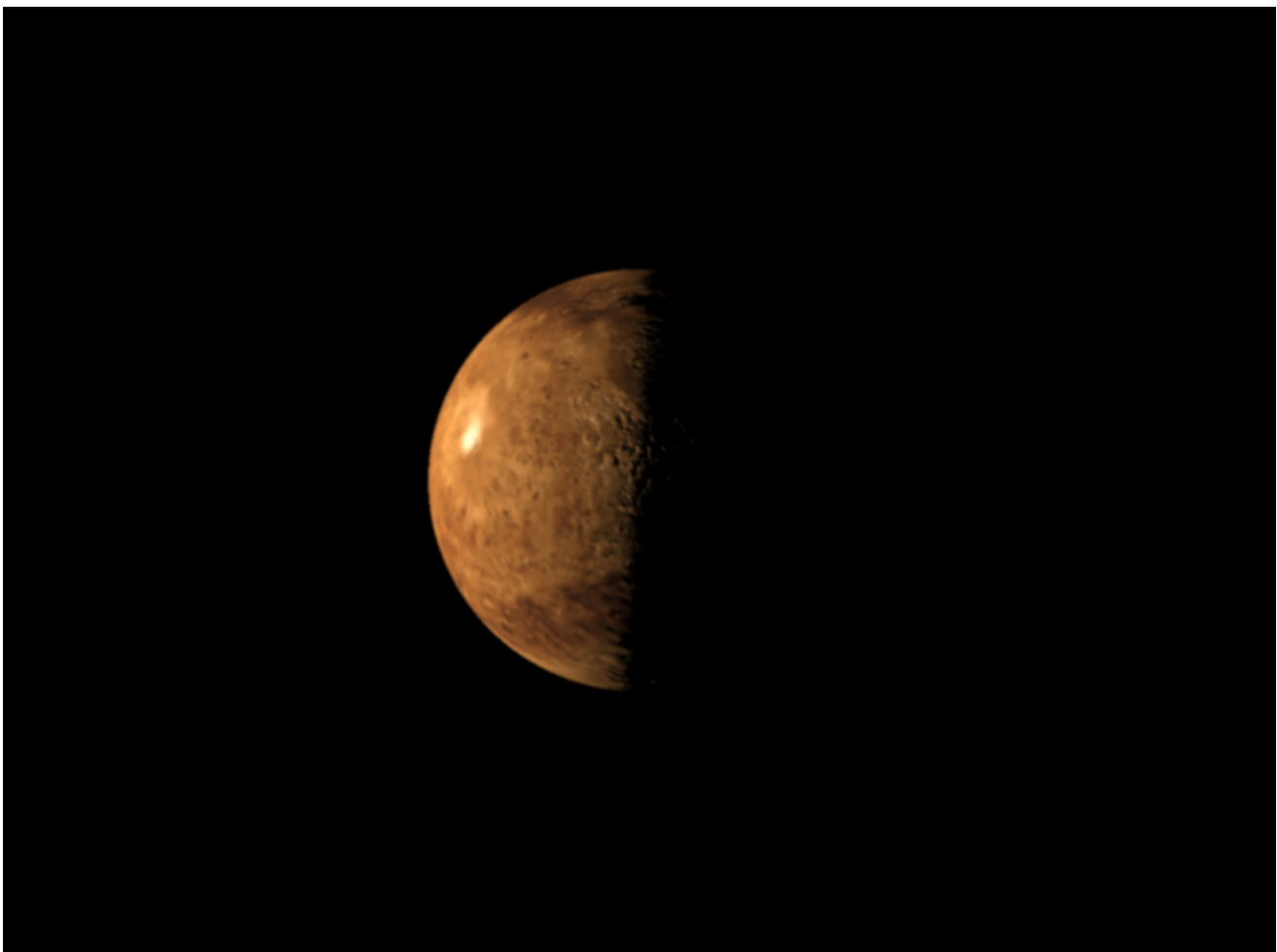


Figure 1: Transiting exoplanet #1.

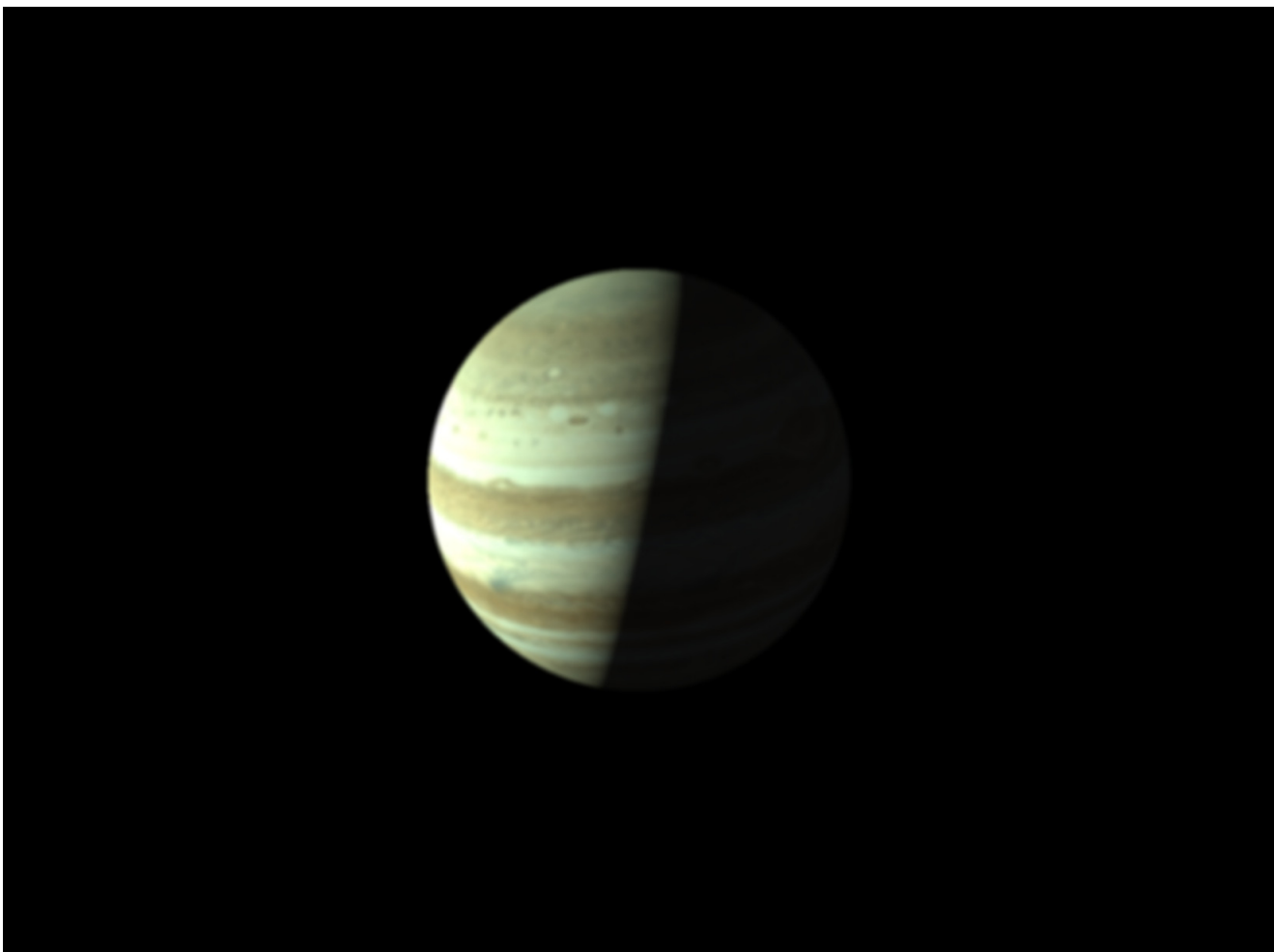


Figure 2: Transiting exoplanet #2.

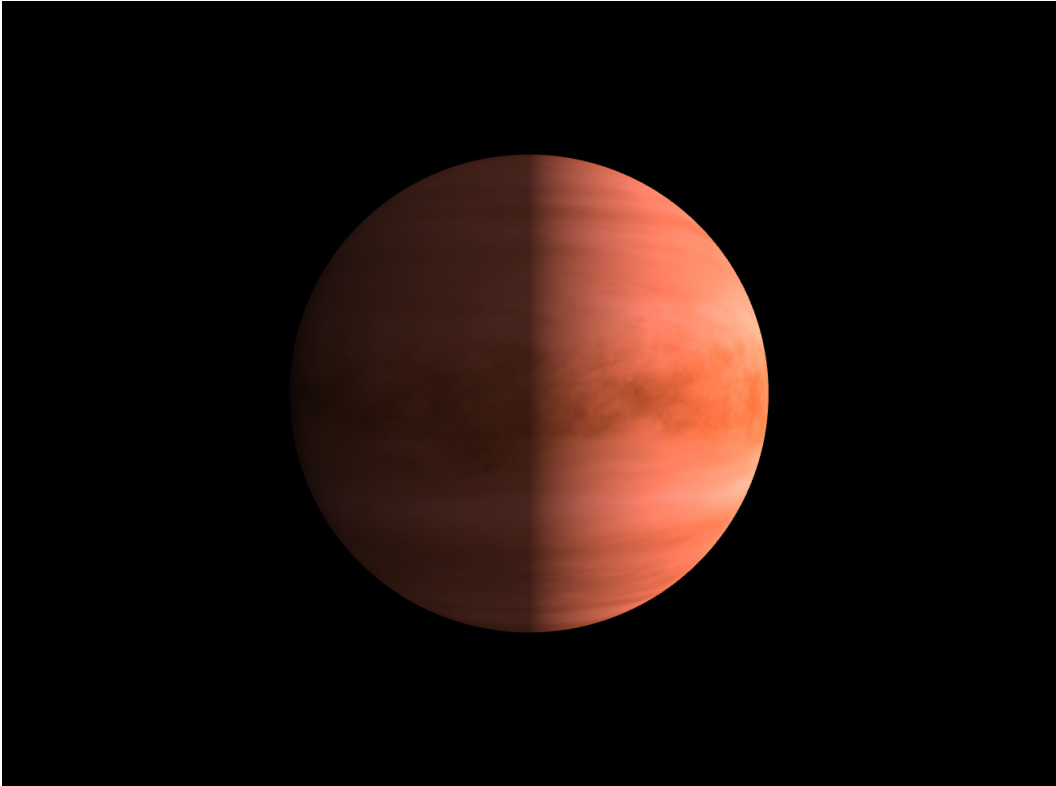


Figure 3: Transiting exoplanet #3.

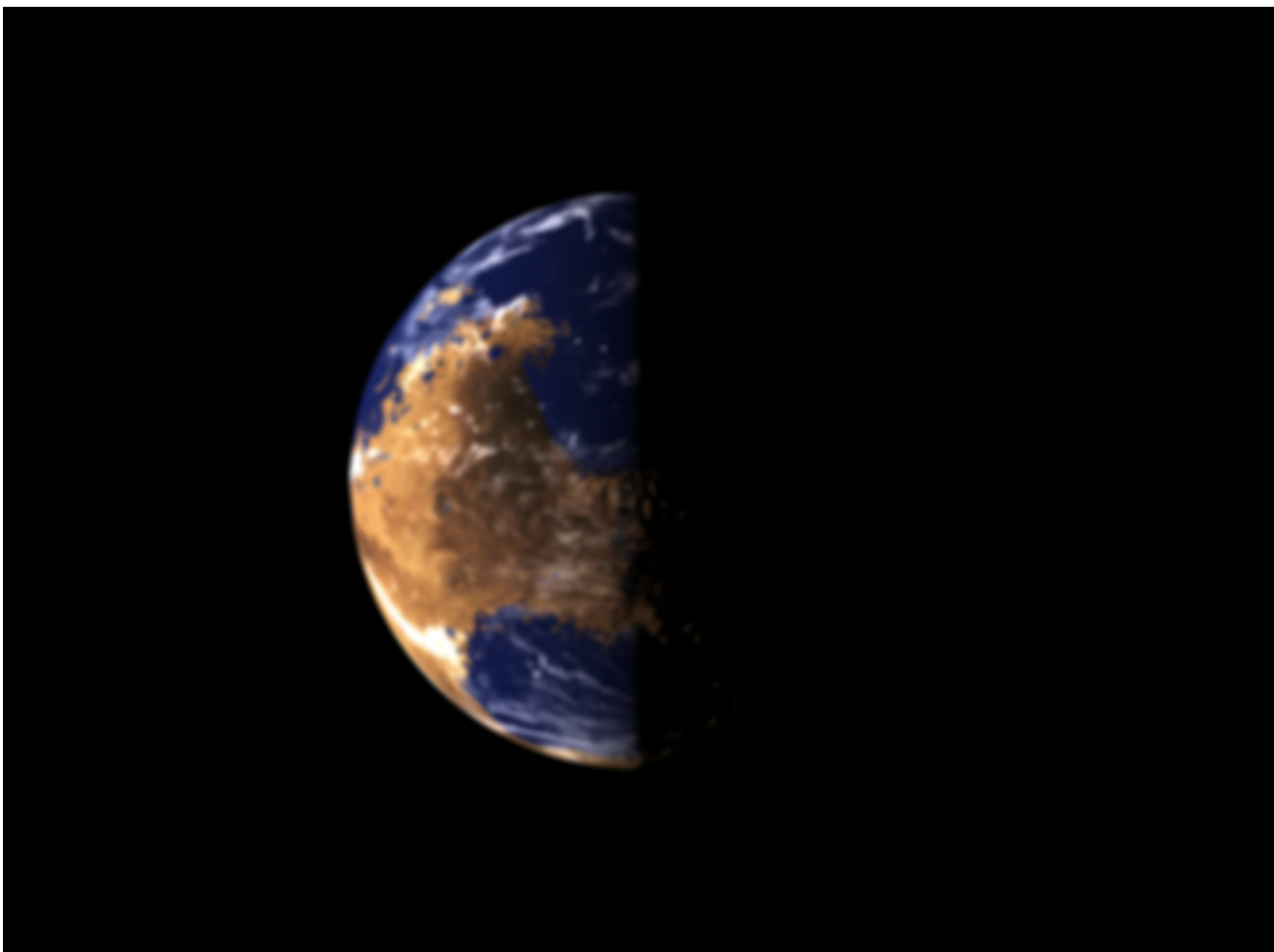


Figure 4: Transiting exoplanet #4.

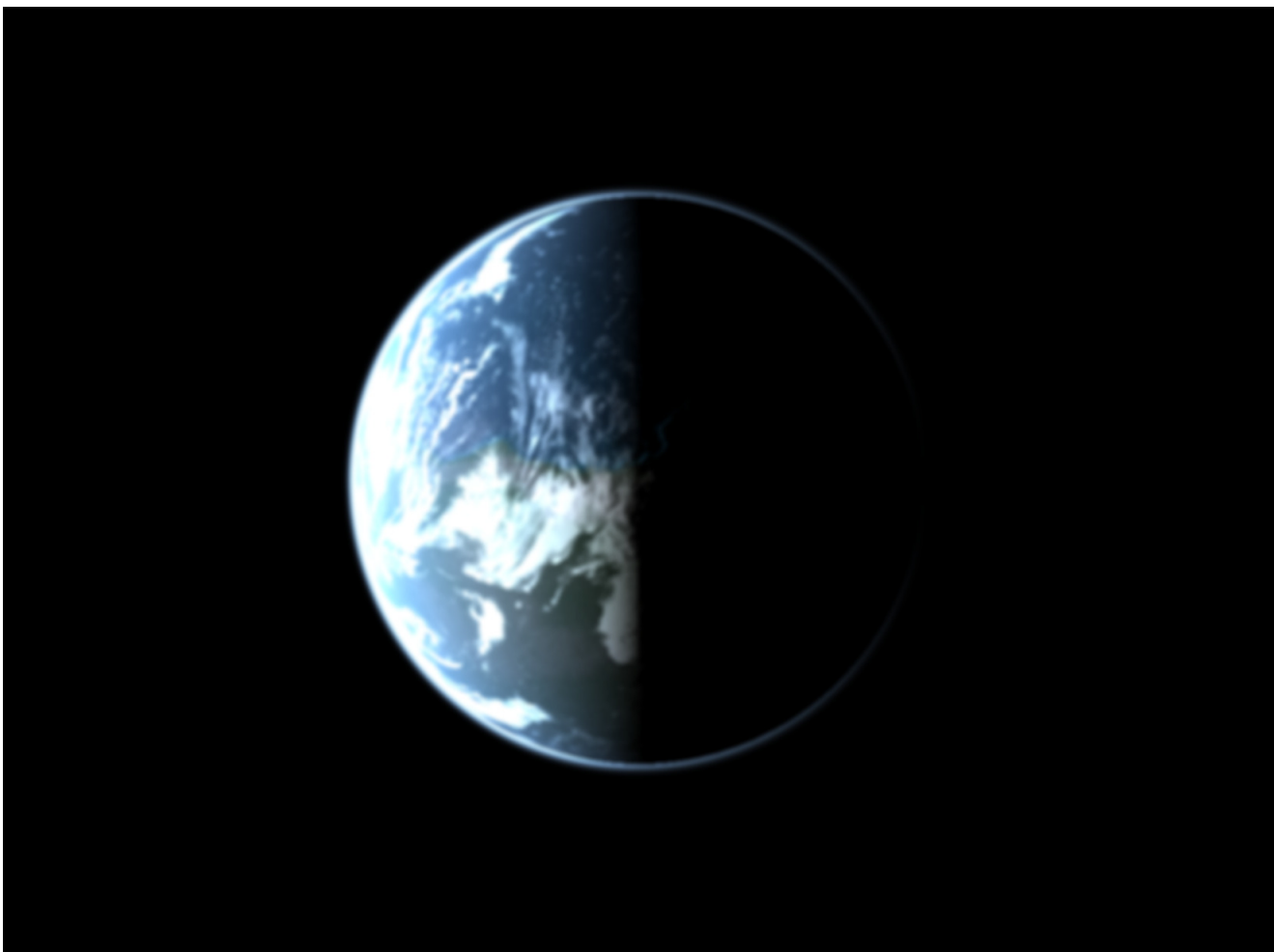


Figure 5: Transiting exoplanet #5.

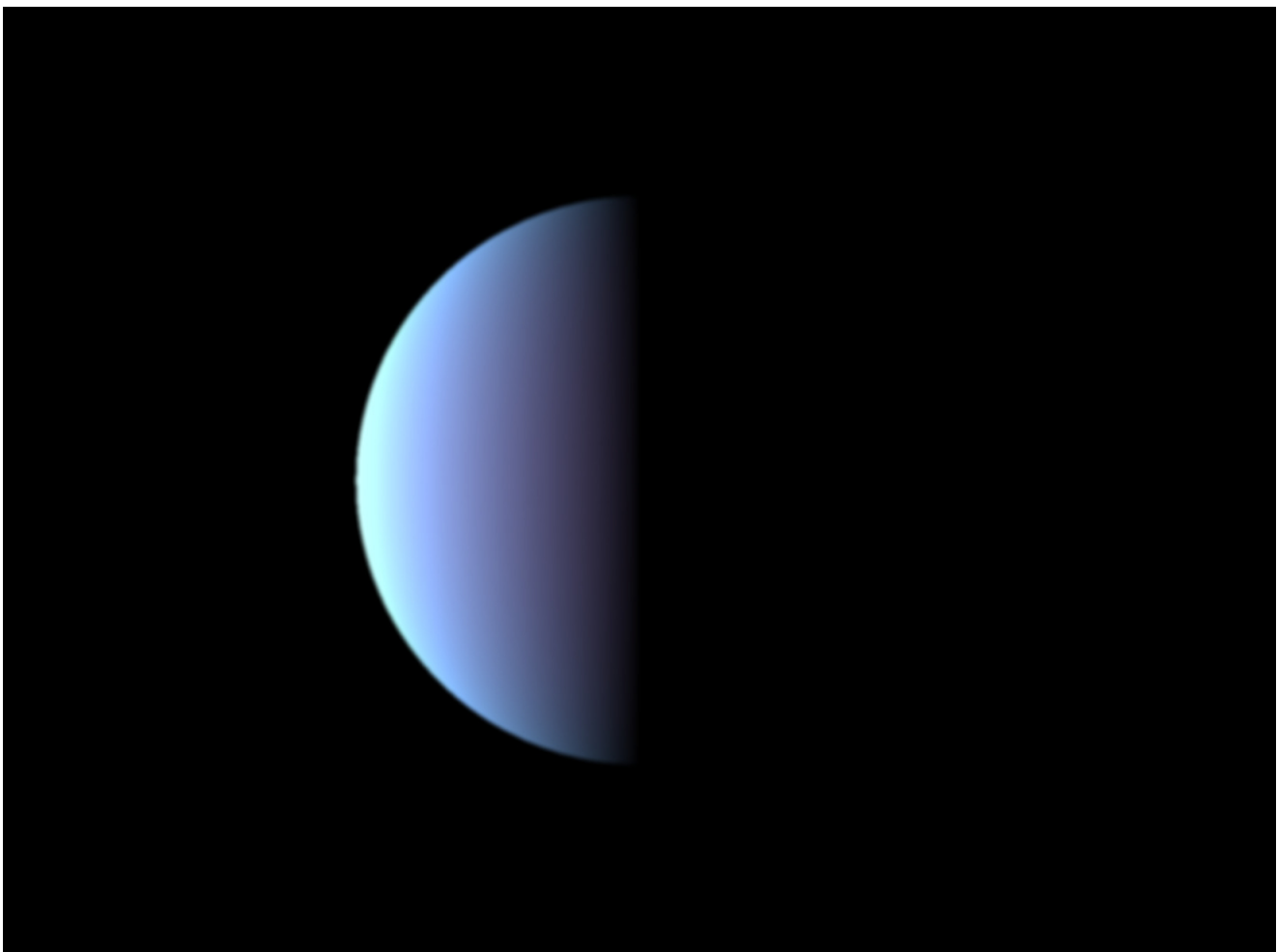


Figure 6: Transiting exoplanet #6.



Figure 7: Transiting exoplanet #7.

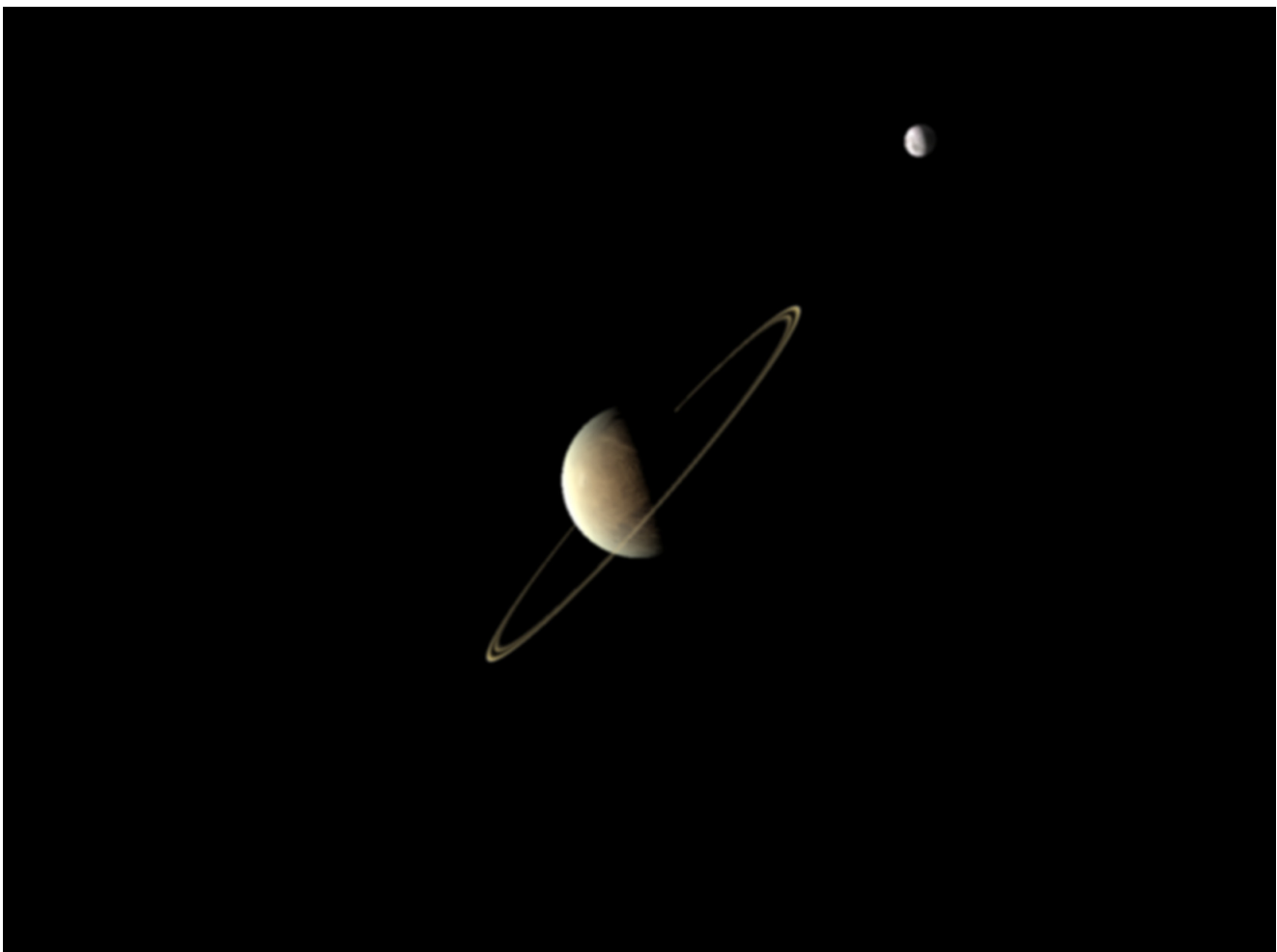


Figure 8: Transiting exoplanet #8.