

AST 250 – Spring 2018
Homework Due: Wednesday January 31

9. The luminosity of the Sun is 3.826×10^{33} erg/s and the radius of the Sun is 6.960×10^{10} cm. Mars is an average distance of 1.524 AU from the Sun. If the typical efficiency of the solar panels on a Martian rover Opportunity is 20% (meaning only 20% of the incident flux is converted into energy) and the solar panels have an area of 1.3 m^2 , how many Watts can the fully illuminated solar panels generate (assume normal/perpendicular incidence)? Hint: be careful about units!

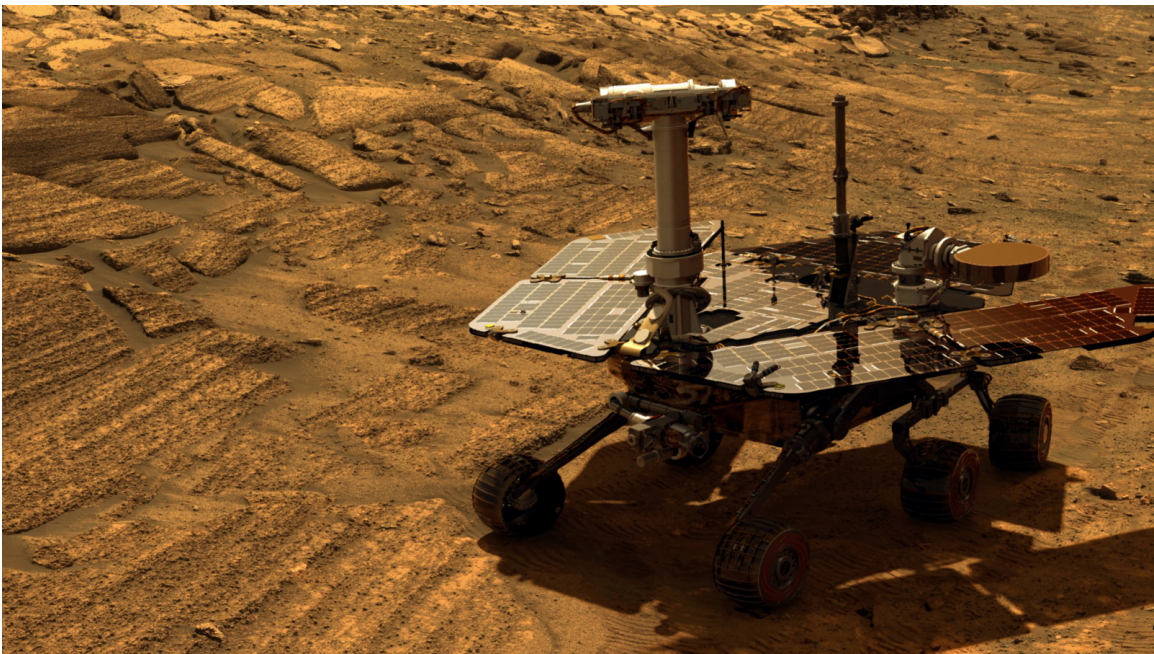


Figure 1: The Martian rover Opportunity. Still rolling...

10. The brightest star in our sky, Sirius, has a mass about twice the mass of the Sun, a radius that is approximately 1.7 times larger than the Sun, and a luminosity that is approximately 25 times larger than the Sun. At what distance would a hypothetical planet orbit Sirius to receive the same flux as the Earth receives from the Sun? Which planet in our Solar System orbits at roughly that same distance from the Sun? **HINT:** Use ratios to make the math easier.