HOMEWORK SET 12

Due November 23, Monday

1. Granules represent the top of convective cells in the Sun. If the convected material moves at 1 km/s, how long does it take to flow across the 1000-km expanse of a typical granule? Compare this with the roughly 10-minute lifetimes observed for most solar granules.

2. The Sun is made of hydrogen atoms. In hydrogen fusion, 0.7% of mass is lost and converted into energy. If 10% of Sun's mass participates in hydrogen fusion over the Sun's lifetime of 10 billion years, what is the mean luminosity of the Sun? The Sun's mass is 2×10^{30} kg, and speed of light is 3×10^8 m/s. Note that your answer should be derived using the information given in this question.