

Exercises for Space Plasma Physics:

VIII. Waves, Shocks and instabilities

1. How does an electro magnetic wave travel in vacuum and in plasma?
2. What is the cut-off-frequency? How can it be used to derive the (electron) density of a plasma?
3. If one observes the Sun in visible light and long radio waves, will the sun (visible radius) look larger, smaller or the same in radio wavelength?
4. Discuss briefly the difference between a sound wave in a neutral gas and slow/fast magnet-sonic waves and Alfvén waves in plasmas.
5. What is Landau damping?
6. What are macro and micro-instabilities?
7. Why are thin current sheets important for the dynamics of space plasmas?