

AST 300B – Spring 2017
Homework Due: Wednesday January 18

1. The total mass of neutral gas in the Milky Way Galaxy is $\sim 4 \times 10^9 M_{\text{sun}}$. Assume it is uniformly distributed in a disk of radius 15 kpc and thickness of 200 pc and that it is a mixture of Hydrogen and Helium with $\text{He}/\text{H} = 0.1$ (by number). Assume ionized hydrogen to be negligible in this problem.

- (a) What is the average number density (cm^{-3}) of hydrogen atoms within the disk? Quote your answer to 2 significant digits.
- (b) If the typical relative speed of hydrogen atoms is about 15 km/s in the WNM and 2 km/s in the CNM, make *simple estimates* of the time between collisions of H atoms in the WNM and the CNM.

