

AST 300B – Spring 2017

In-class/take-home Problems Due: Wednesday April 5th

38. Neutral Carbon (CI) has 3 fine structure levels in the ground electronic state that result in 2 transitions at 370 and 609 μm . See back for energy level diagram of CI.

a. Derive a general expression for the excitation temperature in the optically thin limit that depends on the observed ratio of the integrated intensities of the CI fine structure lines.

b. If observations of the 2-1 line have an intensity of 0.2 Jy and observations of the 1-0 line have an intensity of 0.1 Jy, what is T_{ex} ? Assume optically thin emission.

