

## Intro to Galaxies & AGN

Examples 2 : due Friday February 22, 12noon to Kuang-Han Huang's mailbox

1. As we discussed, the spectrum of radiation from a black-body depends only on its temperature. The form of this spectrum is given by the Planck Function, shown in Fig. 3.8 of Carroll & Ostlie. The wavelength at which the spectrum peaks is inversely dependent on temperature.

(i) Considering the Planck functions of a range of temperatures, demonstrate that the B–V color of a hotter star is bluer (i.e. has a lower numerical value) than that of a cooler star.

(ii) Argue further that the B–V color of an older star cluster is redder than that of a younger star cluster, being careful to explain all the steps in the argument. There are two main effects of stellar evolution that you should discuss.

2. Carroll & Ostlie question 13.11. This is:

(a) The age of the Universe is 13.7 Gyr. Compare this value to the main-sequence lifetime of a star of mass  $0.8M_{\odot}$ . Why is it not useful to go to the effort of calculating the evolution of low-mass stars, below the mass of the Sun, beyond the main sequence (core Hydrogen-burning phase)?

(b) Would you expect to find globular clusters in which the most-massive star on the main sequence was less massive than  $0.8M_{\odot}$ ? Explain.