## ASTR 288C

## Homework 9

Due: 3:30pm, Nov. 06, 2017

For this homework assignment, you need to write down (or type and print out) your answers. Clearly describe the methods you used. If you use any python codes to produce the results, print out your code and attach it at the end of your homework.

Similar to what you did in the lab, download the data for GRB170202A and do the following questions:

- 1. [3 points] Create a mask-weighted light curve with 1-s bin for 15-150 keV from T0-200 s to T0+13 s (i.e., the time before spacecraft slews). T0 is the BAT trigger time. Name your output light curve "sw00736407000b\_15\_150\_1s\_beforeslew.lc". Write down the full command you use.
- 2. [4 points] Find the 1-s peak time interval and the corresponding count rate in this light curve created in question 1. Write down the full command you use, the start and end time (relative to T0) of the 1-s peak interval, and the mask-weighted count rate you find.
- 3. [4 points] Estimate the raw count rate (i.e., non-mask-weighted) count that corresponds to the 1-s peak mask-weighted count in question 2. Clearly lay out the steps of how you find the answer.
- 4. [3 points] Create a mask-weighted light curve with 1-s bin for 15-150 keV from T0+14 s to T0+800 s (i.e., the time after spacecraft slews). Name your output light curve "sw00736407000b\_15\_150\_1s\_afterslew.lc". Write down the full command.
- 5. [4 points] Find the 1-s peak time interval and the corresponding count rate in this light curve created in question 4. Write down the full command you use, the start and end time (relative to T0) of the 1-s peak interval, and the mask-weighted count rate you find.
- 6. [4 points] Estimate the raw count rate (i.e., non-mask-weighted) count that corresponds to the 1-s peak mask-weighted count in question 5. Clearly lay out the steps of how you find the answer.

- 7. [4 points] Create a non-mask-weighted light curve with 1-s bin for 15-150 keV from T0-200 s to T0+800 s. Calculate the average count rate for the background period from T0+100 s to T0+300 s. Use the raw count rates for the 1-s peak intervals that you find in question 3 and 6 to calculate the net peak count rates that corresponds to these two peak times (the ones in question 2 and 5).
- 8. [4 points] Plot the mask-weighted light curve from T0-200 s to T0+800 s. Also, plot the non-mask-weighted light curve from T0-200 s to T0+800 s. Use time relative to the BAT trigger time (T0) in the x-axis. Print out these two plots and turn it in with the rest of your homework.