Grading Rubric : ASTR400B Research Assignment 2

Name: [Weber,Colin](https://github.com/c-webs/ASTR_400b)

**A Introduction 6 / 10**

Each of the below points should be a separate paragraph in your introduction.

1. Define the Proposed Topic. 1/1
2. State why this topic matters to our understanding of galaxy evolution. 1/2
3. Overview our current understanding of the topic. 1/2
4. What are the open questions in the field? 1/2
5. Cite at least 3 journal papers. Use BibTex for formatting citations 1/1
6. Include at least one figure with caption from those papers to motivate your work. 1/2

**B. The Proposal 6 / 10**

They must answer each of the below questions as separate subsections.

1. What specific question(s) will you be addressing? 1/1
2. How will you approach the problem using the simulation data? Here you should outline the codes you’d need to write. It can be in general terms. 2/5
3. Include at least one figure that illustrates your methodology. 1/2
4. What is your hypothesis of what you will find? Why do you think this will occur? 2/2

**C. Misc. 4 /5**

1. Proper Grammar 0/1
2. Included a bibliography 1/1
3. In Latex and ApJ/MNRAS formatting 2/2
4. On Time/On Github 1/1

**TOTAL** 11**/25**

**Late Penalty:**

* if submitted on due date, but after 5 PM  **(-5 points).**
* Proposals will **not be accepted** after the due date.

**Comments: -5: late penalty. -3: need a more coherent introduction. -1: figure needs to be referenced in the text. -3: proposal needs to be more coherent. Talk to us. -1: diagram not clear. -1: grammar and latex accuracy.**

**How would you compute the Jacobi radius graphically ? Why is it important to compare the “graphical” Jacobi radius to analytical ? For the shape of M33’s dark matter, doing both contour fitting and velocities can be too much. I suggest focusing on the first part in the interest of time.**

**For this project, the key is to understand how the density profile of the M33 dark matter profile evolves throughout the interaction and how that evolution is impacted by tides, as measured by the Jacobi radius. To do this, I suggest the following:**

1. **Identify a few key points in the orbit of M33 (e.g. pericenters - closest approaches to M31 - and apocenters - farthest approaches to M31)**
2. **Plot the density profile of M33’s dark matter – that is the dark matter mass computed in the spherical shells divided by the volume of the shell.**
3. **Compute the Jacobi Radius of M33 using the equation from Lecture**
4. **Plot the Jacobi Radius on the density plot from Step 2. Does something interesting happen to the dark matter density profile at the location of the Jacobi Radius?**

**Come to office hours if the above is not clear.**