

Term Paper Rules and Grading Criteria

The term paper requirement is designed to allow you to learn about a topic of your choice at an advanced level. In this course we cover many, many topics, so consequently we can't go into the details that we would like to if we had the time. Being an *introduction* to accretion-powered astrophysics, the emphasis of the lectures is on breadth and general understanding, not depth. The term paper addresses this deficiency by covering one very specific topic in detail.

The choice of Term Paper topic is up to the student with prior approval required. The primary criterion for the suitability of a topic is that it be related to gravitational accretion power.

Format & Style Rules:

- Must be in ApJ Letter format, following ApJ editorial conventions, and in LaTeX using the emulateapj style file (link available on the class webpage).
- Length: 3 journal-length pages, not including figures. Do not exceed the 3 page limit or the paper will be rejected
- Use as many figures/tables as you want; these don't count in the 3-page limit
- Must include properly cited references, including several recent references
- Must include properly formatted equations (define all non-obvious variables)

For convenience, figures can be appended at the end and do not need to be mbedded in the text.

Content Guide:

1. First and foremost, the Term Paper should contain an *in-depth quantitative summary of the current understanding of the selected topic at an advanced level*. It is crucial that the discussion be detailed, precise, and most importantly, *quantitative not qualitative*: give the numbers (and uncertainties) and the equations. Aim for professional level refereed paper content. Note: A paper that is overly qualitative and/or at the undergraduate level will receive a failing grade.
2. The topic should be as specific as possible. but it should not be a summary of a specific object, unless that object is unique (e.g. Sag A* or SS 433 are ok). It should not be a review of a single paper. It should not be a critique of any specific work. It should not contain any research done by the student.
3. Explain *why the topic is important*. What is the astrophysical “big picture” significance? Have a thorough and complete introduction to the topic. The introduction should be as long as it needs to be: a full page typically or even two pages in some cases, and it should contain at least 4 references.
4. This is not a tutorial or a textbook chapter - do not present a derivation unless something is not obvious. Definitely do not explicitly show simple things like algebraic steps or derivatives. But do show and discuss the important starting and final equations.
5. The term paper material must include recent results. There should be several references from papers that have appeared in the last 2-4 years (or more recently, as appropriate for the topic). LANL arXive astro/ph preprints are encouraged.
6. Conclude with a discussion of *what we do not know* about the topic and what *specific* things need to be done to advance our understanding of the topic. Don't say something vague and useless like “more observations are needed”. Instead say exactly what type of observations are necessary. For example, say “A measurement of the disk height versus radius good to 15% are needed to measure alpha,” or “High fidelity 2-d echo mapping of a high-ionization line like C IV 1550 will allow the determination of the BLR dynamics, and hence yield accurate (better than 20%) measurements of the central SMBH mass, spin and orientation.”) The concluding discussion should not be a summary of what was already said in the paper; it should be about the importance of the results.
7. References to books and conference proceedings are definitely okay, e.g. nothing beats Osterbrock & Ferland for nebular physics, or Frank King & Raine for accretion power theory, or Warner for cataclysmic variables. Conference proceedings often contain reviews that are very helpful, but be sure that the conference wasn't too long ago or the material may be out of date.

Caution: Do not pad your paper with references that you have not read and understood!

Grading Checklist

poor okay good excellent

		quantitative statements
		substantial introduction of the topic
		clear statement of why this topic is important
		clear statement of what is currently known
		presentation at graduate/Master's level, not undergrad level
		a solid conclusion of important results (not a summary!)
		discussion of what we do not know
		discussion of what needs to be done to advance our understanding

poor okay good excellent

		all sections are present (abstract, references, keywords, etc.)
		organization; do the sections and paragraphs logically flow?
		general clarity of writing; no vague or ambiguous phrases

		sufficient and useful figures
		clear description of figure contents and meaning in text
		clarity of figure captions
		appropriate use of equations
		appropriate use of tables (if required)

		proper references to previous work in the body of the text
		correct content and format of the references
		includes recent research

		no slang or colloquial expressions (though Latin is ok!)
		proper English (grammar, spelling, etc.)
		definitions of all symbols, abbreviations, etc.