

Sample Topics & Requirements for Astro 730 Projects

A research prospectus: The goal of this exercise is to present a brief concept study that presents a basis for a research project in extragalactic astrophysics. Your task is to illustrate why this particular area is interesting, very, very briefly summarize a significant aspect of the area and make suggest a future research initiative. The proposed project can be observational, tied to an existing facility, theoretical, or based on archival resources (e.g. the Sloan Digital Sky Survey, HST archive, etc.).

The written component is limited to a maximum of the equivalent of 3 pages of text (no smaller than 12 pt Times font, single spaced) and references and one page for figures (this is similar to the requirements for HST observational and theory proposals). I expect you to use references judiciously; i.e. include a few references to key developments and examples of recent work. You may include some data if that would be helpful.

The first page should include a title, your name and affiliation, and a brief abstract (4-5 sentences—by the way, abstracts often are critical for successful proposals). References should follow the AAS journals style.

The oral component will be a 5minute talk, similar to a standard AAS oral presentation. This will be presented in class on May 5 & 7. You should have no more than the equivalent of 5 power point slides, including the title and we will have ~10-15 minutes per talk to allow some time for discussion.

I will collect all of the written projects as submitted and collect them into a galaxies class of '08 research book.

Sample areas: These topics are to provide examples to think about and help get you started. They are fairly broad so you probably will want to develop a sharper focus of one topic for your presentation. You are not limited to this list and can make up your own topic.

Please email me with your choice of topic and I will let the class know. We will not duplicate topics and so the first person to claim a topic will get it. In any case please select your topic on or before April 14 and let me know by email. Thanks!

- Matching between dark matter halos and baryons, e.g. HI density
- Nature of the first stars
- Evidence for hierarchical growth of galaxies
- Origins of spiral structure in the outer HI-dominated disks of galaxies
- Evolutionary implications of polar ring galaxies
- Evolution of the Magellanic Clouds
- Missing dwarf galaxy problem
- Origin of globular star clusters and connections to galaxy formation

- Relationship between super star clusters and globular clusters
- Starbursts, galactic winds and feedback
- Black hole growth and feedback
- Structure of broad absorption line QSOs
- BL Lac phenomenon
- LINER nuclei in relationship to Seyfert galaxies
- Central black hole and its orbiting massive stars in the Milky Way
- Origins of spheroidal dwarf galaxy populations in galaxy clusters
- Over-merging and the birth of disk galaxies
- Drivers of the morphology-density relationship
- Downsizing of star formation in galaxies
- The far infrared-radio correlation in galaxies
- Relationship between gas density and star formation rates
- The puzzle of HI-free S0 galaxies outside of clusters
- Role of the intra-group medium in the evolution of the average disk galaxy
- Astrophysical implication of high velocity clouds
- Fossil radio lobes and the nature of the intra-cluster medium (ICM) in galaxy clusters
- The excess entropy problem for the ICM
- Chemical evolution of the solar neighborhood
- Nature of MgII (or your favorite) absorption line systems towards QSOs
- Gamma ray bursts as probes of the early ISM of galaxies
- Compact galaxy groups as evolutionary engines
- Alpha element enhancement of E-galaxies
- cD galaxies and dynamical processes in clusters of galaxies
- Lyman break galaxies and the early development of stellar populations
- Extremely red objects (EROs) as a phase of galaxy evolution