

ASTR 511: PROPOSALS FOR OBSERVING LABORATORY IV**CCD Imaging with the Fan Mountain 40-in Telescope**

DUE MONDAY SEPTEMBER 29

Laboratory IV involves making CCD imaging observations with the Fan Mountain 40-in telescope. Students will work in the groups already arranged (which also apply to Lab III).

Based on mutual interests, each group is to *propose its own observing program for this laboratory*.

Consult the *Astronomy 311/511 Observatory Handbook* for background information on the Fan Mountain CCD camera and filter complement. At the present time, the filters available are the broad-band U,B,V,R,I set; the Washington C,M,T₂,DDO51,T₁ set; and an H α line-continuum reference pair.

You can propose any program that is feasible for the telescope and equipment and which can be completed in about 2 nights of observing. This means you need to be pretty conservative.

CCD imaging programs successfully undertaken in ASTR 511 in the past have included both extragalactic (e.g. S0 galaxy color gradients, starburst galaxy H α imaging, edge-on galaxies) and galactic (star clusters, planetary nebulae) programs. The program should be of current astrophysical interest and fruitfully extensible to a larger telescope, with the 40-in observations themselves playing mainly a supporting or preparatory role. The point-source limit for reasonable exposure times with the 40-in is around $V = 17$.

In the course of the lab, you will plan, execute, and reduce the observations. We will not have time for a full scientific analysis, though you will be expected to comment on interpretation. Each group will submit a single, joint report, the deadline for which will be Friday, December 11.

Each group should write up and submit a brief, 1-page preliminary proposal by Monday, Sept. 29. This should describe the scientific goal and a set of likely targets (including brightnesses). We will consult on refining each project.

TIPS ON WRITING (REAL) PROPOSALS

A compelling proposal must be clearly, persuasively, and concisely written and must demonstrate: (1) that the questions you are asking are important/interesting; (2) that the program is technically feasible; (3) that it will provide a definitive answer to the questions posed.

Some tips:

- A. Ask the right questions. Learn to rank issues for overall importance to the field and for novelty.
- B. Learn to assess solvability: which problems are ripe for progress?

- Solvability is a function both of state of current understanding and available instrumentation
- Many “interesting” problems are not ripe for solution
- Evaluate SNR issues

- Learn to assess the interests & strengths of competing groups & their prospects for beating you to a result.

C. Plan to take quick advantage of new observational capabilities

- These can be as simple as a new type of imaging filter.

D. Know the background thoroughly

- Learn to critically dissect the literature, based on original, not secondary, sources.
- Beware of "emperor's new clothes."

E. Develop a healthily skeptical outlook

- Cultivated skepticism is the cornerstone of science:

"He believed in the primacy of doubt, not as a blemish upon our ability to know but as the essence of knowing." — J. Gleick, writing about physicist Richard Feynman.

- Apply to: established results, new results, and especially your own results

Be self-critical: make "reality check" your mantra

F. Develop skill with ROM estimation

G. Learn to write well

- Few people learn to write well in college; practice is essential; consult style guides for tips (e.g. use of topic sentences at beginning of paragraphs)
- Write for harried TAC members who have only a few minutes to read each proposal and who are looking for reasons to reject

Keep it short and clear: use subheadings, short paragraphs, large fonts; don't crowd text

Put key points up front

Don't waffle: where ambiguities exist, state clearcut choices and how you intend to resolve the issues involved

Illustrations add interest and can substitute for lengthy text

- Essential: proofread line-by-line, from paper (not a computer screen); always spell-check.