

Suggestions for Thorough and Efficient Literature Searches

When you are tasked with performing a literature search on a topic with which you either are unfamiliar or have only a little experience, here are some helpful suggestions:

1. **Keyword Search:** Try keyword searches using online databases (see below). Depending on the keywords chosen, this can either be very effective or can fail completely. In particular, for interdisciplinary topics (spanning plasma physics and space physics and astrophysics), the terminology is often very different in different fields, or even between different research groups in the same field. It is often necessary to try a wide range of different keywords (different words that often mean the same thing) in order to capture as many different relevant papers as possible.
2. **Retrospective Search by Citation:** If you have a recent paper on the topic, use the references in the paper to find earlier works that may be relevant to your goal. If you have a few recent papers, common citations between them often point to the more important papers in the field. Note that electronic databases often can provide the number of citations that have been made to a particular paper, giving you a handle on the impact and importance of the paper in the field (although not all good papers are necessarily widely cited).
3. **Search by Author:** If you know of one of the great minds in a particular field, browsing the titles of the papers published by that scientist often can help you find important early works. Great minds tend to be clear thinkers, and sometimes write introductory or review papers that are accessible to new readers.
4. **Forward Search by Citation:** Electronic databases enable you to find all later articles that have cited a particular paper. This is the complement of the retrospective search by citation, enabling you to search for more recent works on a particular topic, and perhaps allowing you to find a more recent review article on the topic. This is also useful if you want to find recent work in a particular field—for example, to find the latest publications related to your thesis topic.
5. **Review Article Search:** Find a recent review article on the topic. If this review article itself does not provide a clear introductory picture, it will certainly reference earlier review articles that may do the job.

Some specific journal that specialize in publishing review articles are:

- Reviews of Modern Physics
 - Space Science Reviews
 - Annual Review of Astronomy and Astrophysics
 - Annual Review of Earth and Planetary Sciences
 - Reviews of Geophysics
 - Astrophysical Journal Supplement Series
6. **Search the Database of a Specific Journal:** You can always just search a particular journal—for example, *Physics of Plasmas*—to find articles on a particular topic, using a number of the approaches above.

7. **Textbooks on the Topic:** Often for mature scientific topics, textbooks have been written that present an excellent introduction and some pointers to more advanced topics. In addition, there exist series of books that focus on reviews of particular topics, some of which are:
 - Reviews of Plasma Physics (Russian)
 - Handbook of Plasma Physics, Vol I and II.
 - Astronomy and Astrophysics Library, Springer
8. **Talk to Faculty:** You can always talk to our faculty in plasma physics, space physics, and astrophysics to give you a starting point for where to begin searching for information about a particular topic (recent papers, a review article, or the name of a prominent scientist who has published on that topic).
9. Combine all of the above approaches to accomplish a thorough and efficient literature search.

Online Resources Literature Searches

1. SAO/NASA ADS: Smithsonian Astrophysical Observatory/NASA Astrophysics Data System
http://adsabs.harvard.edu/physics_service.html
2. Web of Science (link through UI Library website)
<http://www.lib.uiowa.edu/eresources/genindexes.html>
3. AGU EASI (Earth and Space Index) Index: Returns any papers in AGU journals
<http://europa.agu.org/?view=search&adv=1>
4. Single Journal/Publisher Searches:
 - Journal of Geophysical Research (AGU—American Geophysical Union)
<http://europa.agu.org/?view=search&adv=1>
 - Physics of Plasmas (AIP—American Institute of Physics)
<http://pop.aip.org/search>
 - Physical Review Letters (APS—American Physical Society)
<http://publish.aps.org/search>
 - Astrophysical Journal (IOP—Institute of Physics)
<http://iopscience.iop.org/search>

Hints for effective searches of online databases:

1. Learn the rules for searches, for example Boolean operators AND, OR, etc. and wildcards “Howes, G*”. This can make your searches much more effective, but search engines often use different conventions, especially with respect to first names or initials.
2. For retrospective and forward citation searches:
 - NASA ADS: References in the article are given by “R,” and citations to the article are given by “C.” They also provide a citation history, useful to monitor to impact of a given publication.
 - Web of Science: References appear under “Cited References”. Citations to the article are given under “Times Cited”. You can also use the “Create Citation Report” button to look at the citation history for a particular author or paper.
3. Web of Science: You can narrow down your search to particular research area, document type, or other criterion.
4. You can also refine your search to specific journals, which can be useful if you know the paper you are seeking was published in a particular journal.

5. Review article search: If you want to find review articles on a particular topic, you can do this with the online databases:
 - NASA ADS: If you select “ADS Labs” on the search page, you go to a streamlined search page that is under testing. You can select “Reviews and introductory papers”. Top authors on this topic are listed on the left, so this helps you find out who is publishing in this area.
 - Web of Science: You can refine your search by including only “Review” in the Document Types category.

Other Comments

1. Brainstorm keywords, and even talk to faculty or other researchers to find out the common terminology.
2. When you do a keyword search on a topic, certain names may keep popping up. Keep track of these names to perform subsequent searches by author.
3. Searches for Chinese names are notoriously difficult. You absolutely must use the first initials, and even then you will often find a large number of results that are not relevant to your search.