

Physics

An annotated list of key resources on the Internet

by Laurel Kristick

Physicists have been using the Internet since its earliest days. The Department of Energy's high-energy physicists created HEPnet, developed in the 1970s along with other specialized nets. This group also helped develop the foundation of the World Wide Web in 1989. A physics laboratory (Stanford Linear Accelerator Center) was the first U. S. Web site.

There are an incredible number of Internet sites related to physics. An AltaVista search on the word "physics" will pull up more than 2.7 million hits. The sites identified here will get you started in locating the most useful physics sites on the Internet.

General physics metasites

- **Resources in Physics.** The Physics-Astronomy-Mathematics (PAM) division of the Special Libraries Association maintains this site, which provides links to physics resources organized around the following areas: people, professional societies, institutions, reference, eprints, and pathfinders. *Access:* <http://pantheon.yale.edu/~dstern/phys.html>.



- **The Internet Pilot to Physics.** This site is the result of an international effort to improve the use of information technology and the Web in physics research and education. It is aimed at promoting physics not only to scientists but also to the industry, schools, students and any individuals interested in physics and natural science. It includes an Internet search engine that focuses on physics sites, physics-related Java applets, and physics discussion forums. *Access:* <http://physicsweb.org/TIPTOP/>.

- **Yahoo! Science: Physics.** Metasite for Internet resources, organized by physics discipline. *Access:* <http://dir.yahoo.com/Science/Physics/>.

- **WWW Virtual Library—Physics.** Links to several sections of the Virtual Library related to physics. The Virtual Library is the oldest catalog of the Web, started by Tim Berners-Lee, the creator of html and the Web itself. It is run by a loose confederation of volunteers. *Access:* <http://vlib.org/Physics.html>.

Specialized physics Web indexes

There are many sites that list key Internet sites for various physics subjects. This is just a sample; many others can be found in the general indexes section above.

About the author

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- **Online Particle Physics Information.**

This guide organizes online catalogs, databases, directories, Web pages, etc., which are of value to the particle physics community and provides descriptions of each resource's scope and content to assist researchers in choosing the right source to fit their information needs. The Stanford Linear Accelerator Center's Particle Data Group maintains it. *Access:* <http://www.slac.stanford.edu/library/pgd/>.

- **General Relativity around the World.**



The NCSA Relativity Group maintains this site that provides links to Internet resources on relativity. *Access:* <http://jean-luc.ncsa.uiuc.edu/World/world.html>.

- **Particle-Surface Physics Resources on the Internet.** Annotated list of Internet resources maintained by Mark Shapiro at California State University in Fullerton. *Access:* <http://chaos.fullerton.edu/mhslinks.html>.

Professional societies

- **American Institute of Physics (AIP).**

AIP was founded in 1931. It currently has ten member societies, including the American Physical Society (<http://www.aps.org/>), the Optical Society of America (<http://w3.osa.org/>), and the American Association of Physics Teachers (<http://www.aapt.org/>). These societies have more than 129,000 members. *Access:* <http://www.aip.org/>.

- **Institute of Physics (IOP).** IOP, based in Britain, has more than 26,000 members worldwide and publishes 34 journals in physics and related areas. The table of contents of these journals are available to the public from this site. *Access:* <http://www.iop.org/>.

- **Resources of Scholarly Societies—Physics.** An up-to-date site maintained by the University of Waterloo, with links to physics professional and scholarly societies around the world. *Access:* http://www.lib.uwaterloo.ca/society/physics_soc.html.

Laboratories

- **European Organization for Nuclear Research (CERN).** The CERN Laboratory provides state-of-the-art scientific facilities for researchers to use. It has 3,000 employees and more than 6,500 researchers from around the world that use the facility. Their Web site has a great deal of information on the research be-

ing conducted at the laboratory. *Access:* <http://www.cern.ch/>.

- **Fermi National Accelerator Laboratory (Fermilab).** A U.S. Department of Energy national laboratory for research exploring the fundamental nature of matter and energy. Site includes a cybertour of Fermilab with information on high-energy physics and the research done at the laboratory. *Access:* <http://www.fnal.gov/>.



- **Stanford Linear Accelerator Center (SLAC).** SLAC dates back to 1962. The site has a virtual Visitor's Center page with an introduction to SLAC, and a lot of information for students and teachers. *Access:* <http://www2.slac.stanford.edu/vvc/home.html>.

- **Physics Departments Worldwide.** The University of Oldenburg in Germany maintains this site of physics departments around the world with lists by continent/country and a search option. *Access:* <http://marvin.physik.uni-oldenburg.de/EPS/PhysNet/physdep.html>.

Preprint sites

Preprints and their electronic version (eprints) are a critical part of the scholarly communication process in physics. They are papers that have been submitted for comment and review among peers, for publication in journals, or prior to presentation at conferences. They are often the first choice of physicists looking for information on current research.

- **ArXiv.org Eprint Server.** Founded by Paul Ginsparg, this eprint archive began with a focus on High Energy Physics (HEP). Started in August 1991, arXiv.org (formerly xxx.lanl.gov) is a fully automated electronic archive and distribution server for research papers. Covered areas include physics and related disciplines, mathematics, nonlinear sciences, computational linguistics, and neuroscience. *Access:* <http://xxx.lanl.gov/>.

- **Physics Preprints, Abstracts, Reports.** Index site maintained by the Center for Scientific Computing in Finland. This site has links to preprint sites for various physics disciplines. *Access:* <http://www.csc.fi/physics/Preprints.html>.

Reference sources

- **NIST Physical Reference Data.** National Institute of Standards and Technology (NIST) site maintained by the Physics Laboratory operating unit. A searchable resource containing physical constants, spectroscopy data, and other data. *Access:* <http://physics.nist.gov/PhysRefData/>. Other NIST databases related to physics, including nuclear physics data and condensed matter data, are available at <http://physics.nist.gov/PhysRefData/contents.html>.



NIST Physics Laboratory

- **Eric Weisstein's Treasure Trove of Physics.** Online encyclopedia of physics created by Eric Weisstein, a Ph.D. in planetary science. An excellent resource for definitions of physics terms. *Access:* <http://www.treasuretroves.com/physics/physics.html>.

- **A-Bomb Bibliography.** An extensive bibliography of resources related to the development of the atomic bomb, maintained by T. M. Sanders at the University of Michigan for his course on Physicists and the Bomb. *Access:* <http://tms.physics.lsa.umich.edu/214/other/biblio/index.html>.

- **AIP Physics News.** American Institute of Physics (AIP) weekly bulletin of physics news with a searchable archive. It is a digest of physics news items arising from physics meetings, physics journals, newspapers and magazines, and other news sources. *Access:* <http://www.aip.org/physnews/update/>.

Electronic journals

Many of the society publishers of physics journals provide electronic access to their journals to institutions subscribing to the paper versions. Institutions interested in pursuing this access should consult the societies' Web pages (see above for access points). The following journals have free access to the full text.

- **New Journal of Physics.** A peer-reviewed, all-electronic journal publishing original research in all areas of physics, produced by the Institute of Physics. *Access:* <http://www.iop.org/EJ/welcome>.

- **Journal of High Energy Physics (JHEP).** A peer-reviewed electronic journal sponsored by CERN. *Access:* <http://jhep.mse.jhu.edu/>.

Educational resources

- **BUBL Link—Physics Education.** A catalog of Internet resources in physics education. *Access:* <http://bubl.ac.uk/link/p/physicseducation.htm>.

- **College Physics for Students of Biology and Chemistry.** Hypertextbook written for first-year undergraduate physics students, written by Kenneth R. Koehler and Raymond Walters College at the University of Cincinnati. Requires JAVA 1.1 or later version and Mathematica or MathReader software. *Access:* <http://www.rwc.uc.edu/koehler/biophys/text.html>.

- **Learn Physics Today.** Online physics tutorial developed by faculty at Colegio Franklin D. Roosevelt in Lima, Peru. Requires JAVA to run the tutorial. *Access:* <http://library.thinkquest.org/10796/>.

- **Physics 2000.** An interactive introduction to modern physics developed by Professor Martin V. Goldman at the University of Colorado, Boulder. Requires JAVA. *Access:* <http://www.colorado.edu/physics/2000/index.pl>.

- **Physics Applets.** University of Oregon's collection of JAVA applets for use in physics, astronomy, or environmental sciences courses. *Access:* <http://jersey.uoregon.edu/vlab/>.

People in Physics

- **PEERS.** Institute of Physics site; a look-up service for physicists and other scientists. *Access:* <http://www.iop.org/cgi-bin/PEERS/main>.

- **Who's Who In Atomic and Plasma Physics.** Searchable site at the Plasma Laboratory at the Weizmann Institute of Science with more than 980 entries of physicists working in atomic and plasma physics. *Access:* <http://plasma-gate.weizmann.ac.il/cgi-bin/wwapp/>

- **HEP Virtual Phonebook.** This High Energy Physics directory has links to phone books and directories of HEP sites or experiments around the world compiled by the HEP Network Resource Center. *Access:* <http://www.hep.net/sites/directories.html>.

- **Famous Physicists.** Yahoo's index of sites of famous physicists, such as Richard Feynman, Niels Bohr, and Marie Curie. *Access:* <http://dir.yahoo.com/Science/Physics/Physicists/>.

- **Nobel Laureates in Physics, 1901–1999.** Stanford Linear Accelerator Center Library's resource on Nobel laureates, with brief

biographical entries and a description of the discovery that earned the Nobel Prize. *Access:* <http://www.slac.stanford.edu/library/nobel.html>.

• **Contributions of 20th Century Women to Physics.** An archive of more than 80 citations of women who contributed to physics in the 20th century created by the UCLA Department of Physics. *Access:* <http://www.physics.ucla.edu/~cwp/>.

History of Physics

• **Center for the History of Physics.** This center, a section of the American Institute of Physics, has a mission to preserve and make known the history of modern physics and allied fields, including astronomy, geophysics, optics, and the like. *Access:* <http://www.aip.org/history/>.

• **History of Physics Group.** The Institute of Physics established this group in 1984 to secure the written, oral, and instrumental record of British physics for posterity and to explore ways in which history can be used more effectively in the understanding, teaching, and general communication of physics. *Access:* <http://www.iop.org/TOP/Groups/HP/>.

"Scholarly Comm." cont. from page 186)

Agreement was reached on the following to pave a path forward:

- the minimal Dienst protocol set will be implemented for all archives that were represented at the meeting. This will allow for a first round of experimentation with the creation of end-user services layered over existing archives;

- there is an urgent need to discuss the mechanisms used to submit material to archives;

- it is important to have presentations and/or workshops at upcoming digital library conferences;

- the experimental, non-production prototype that was presented at the meeting will temporarily be available for exploration at <http://ups.cs.odu.edu>. The representatives of Old Dominion University, Los Alamos National Laboratory Research Library, and the University of Ghent expressed their interest in continuing this prototyping work; and

- the UPS Initiative has been renamed. It is now referred to as the Open Archives Initiative.

Discussion groups

A key mailing list for physics librarians is PAMnet, the discussion list for the Physics, Astronomy and Mathematics (PAM) Division of the Special Libraries Association. The purpose of PAMnet is to provide a forum for the discussion of library and information resource issues relevant to physics, astronomy, and mathematics. PAMnet may be used to seek help with reference questions and in obtaining materials, but only when those materials are not available through a library's normal ILL or document delivery suppliers or when timing is critical. The list is open to non-PAM division members. To subscribe, contact David Stern, the list owner, at david.e.stern@yale.edu.

Other mailing lists related to physics can be found in the Physics section of "The Directory of Scholarly and Professional E-Conferences," maintained by Diane Kovacs. *Access:* <http://www.n2h2.com/KOVACS/S0106.html>.

There is a physics hierarchy of discussion groups in Usenet. These include `sci.physics`, `sci.physics.relativity`, and `sci.physics.research`. ■

Some issues and questions

The initiative discussed above raises several social issues concerning scholarly communication. Among the issues of relevance to academic and research institutions are the following:

- Will the institution provide or support a departmental or institutional e-print archive of authors affiliated with the institution? If so, will it adopt or incorporate the Santa Fe protocols to gain wider exposure and interoperability?

- How will research libraries package and deliver access to e-print literature?

- With the resolution of e-print archive interoperability technical issues, what will be the process of resolving the social issues connected with tenure and publishing?

While it is not the intent of the Open Archives Initiative to deal with those social issues, their resolution will be an important factor in determining how quickly the paradigm for scholarly communication will change. At our meeting in October, we tried to lay the groundwork for technical standards that will support new models of scholarly publishing. ■

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