PHYSICAL REVIEW E
INFORMATION FOR CONTRIBUTORS
(Revised January 1999)

Information about this journal and other APS journals is available on the APS research-journals **World Wide Web** server at the URL http://publish.aps.org/. Much information is also available via ftp to aps.org in the subdirectories /jrnls, /pacs, /revtex, etc., of the /pub directory. Most filenames include as an extension a suffix (beginning with a period), which indicates the nature of the file: .asc (plain ASCII), .pdf (portable document file, usable with Acrobat), .ps (PostScript), or .tex (TeX). Most files exist in two or three versions, distinguished by the suffix. Some specific files are cited where pertinent below.

Manuscripts may be **submitted** by a variety of electronic modes (including via e-print servers, direct Web upload, and email), or by conventional mail, but not by fax. Interactive **submission forms**, available on our Web server, are an integral part of the submission process for the e-print and Web modes, and are strongly recommended for email and conventional-mail submission. These forms aid authors in supplying all the information needed in a structured format which furthers efficient processing; they also provide a location for additional ''free form'' information. [For authors without Web browsers which support forms, noninteractive versions of the submission forms are available via ftp to aps.org in the /pub/jrnls directory as the sub_pre files (include filename suffix .asc, .tex, or .ps), or by request to the Editorial Office.]

Please specify the author to whom correspondence should be addressed, and give all available communications information for this individual (postal and email addresses, phone and fax numbers), since in various circumstances they may all be useful. Please specify journal and section to which the paper is submitted, and give PACS (Physics and Astronomy Classification Scheme) index categories if possible. (The scheme is available on our Web server, and also via ftp to aps.org as the file pacs_99.asc in the /pub/pacs directory.) If an important subject of your paper cannot be appropriately classified in the PACS scheme, please give an appropriate keyword or phrase, and indicate approximately where in the scheme this topic would be best placed.

A signed APS **copyright-transfer** form should be included with the submission, and will be required before publication. While the transfer of copyright takes effect only upon acceptance of the paper for publication in an APS journal, supplying the form initially can prevent unnecessary delays. The form appears at the end of the 17 August 1998 issue of *Physical Review Letters* and is available from the Editorial Office, on the World Wide Web via the URL http://publish.aps.org/ or via ftp to aps.org in the /pub/jrnls directory as the copy_trnsfr files (include filename suffix .asc, .ps, or .tex). Be sure to use the latest (1/96 or later) version of the form.

Manuscripts and figures are *not routinely returned* to authors. Authors should indicate (preferably on initial submission) if they want the manuscript and/or figures returned when correspondence is sent during the editorial process, and/or after a final decision has been made.

Electronic submissions may be formatted in REVTeX (preferred), LaTeX, Harvmac, or Plain TeX. The file must be in ASCII containing no control codes, with line lengths of 80 characters or less. All textual material of the paper (including tables, captions, etc.) should be in electronic form, as a single file. The file should produce double-spaced output. Properly prepared electronic submissions are eligible for a **publication-charge discount**, whether or not they also qualify for the compuscript-conversion production program. See paragraph beginning with ''compuscripts'' (below).

For information about submission via **e-print** servers or direct **Web upload**, see our Web server at http://publish.aps.org/ESUB/.

Electronic-mail submissions (and inquiries about them) should be sent to the Internet address pretex@aps.org. For the initial submission, use as the subject ''submit'' followed by the three-letter abbreviation for the name of the journal (pre) and the last name of the first author; for example, ''submit pre jones'' or ''submit PRE Jones.'' Include the filled-out submission form (or the equivalent information, including journal, section, postal address, etc.) in the first part of the electronic-mail message. Receipt of an electronic-mail submission will be acknowledged within 24 hours. Copies of the manuscript should not be sent by regular mail (only original figures) unless the electronic transmission has not been successful.

Figures for an electronic submission must be received in at least review-quality form before editorial processing can begin. Web upload or electronic-mail transmission (one figure per file) of PostScript-formatted figures will normally meet this need. For color or continuous-tone PostScript figures, hard-copy originals are also required. The originals are needed to ensure that the reproductions created from the electronic figure files are satisfactory. (For email transmission, use a subject line similar to that for the text file with the

addition of the figure number, e.g., ''submit pre jones fig1''.) Alternatively, you could send scanner-reproducible journal-quality ''originals'' immediately by overnight mail. A third possibility is to send review-quality figures by fax (516-591-4141), while the ''originals'' are sent by conventional or overnight mail as soon as possible; please mark the fax transmission as being part of an electronic-mail submission. On resubmission, it is only necessary to resend your figures if the originals in our file are no longer valid.

Manuscripts sent by **conventional mail** should be submitted in quadruplicate to the Editors, Physical Review, 1 Research Road, Box 9000, Ridge, NY 11961-9000. The manuscript, including the abstract, references, and captions, should be neatly printed in English, on good letter-size (e.g., $8\frac{1}{2}\times 11$ in. or A4) white paper with ample margins. (The first copy, used for production purposes if the paper is accepted for publication, must be printed on one side of the paper only; additional copies, used for review purposes, may be printed on both sides of the paper.) The type size and line spacing should be sufficient to accommodate editorial markings and should be legible to our keyboarders (no more than three lines per inch and no more than 88 characters per 6 inches). It should be carefully proofread by the author. Poor reproductions are unacceptable, as are unclear or excessive handwritten insertions.

Compuscripts are author-supplied computer files that can be used for production essentially as supplied. (Some minor style modifications may be made if needed.) If the paper is accepted for publication, the file is converted to production format and coding (eventually SGML), from which base the journal pages are composed. Appropriate REVTeX files are eligible (the other electronic-submission formats are only useful for the editorial-review process). Questions about file eligibility should be directed to pretex@aps.org. Papers intended for the compuscript production program should be submitted and resubmitted *only electronically*. PostScript figures may be used directly (electronically) in the production composition process.

REVTeX is APS's LaTeX macro package used to produce compuscript files with the standard structure and coding needed for our journals. The REVTeX software (macros, examples, and documentation) is available via ftp to aps.org in the /pub/revtex directory. For further information on REVTeX, inquire by electronic mail to mis@aps.org.

An information and instruction booklet regarding electronic submissions and compuscripts is available via ftp to aps.org in the /pub/jrnls/ directory as the compu_inform_pr files (include filename suffix .asc, .ps, or .tex).

For **resubmissions**, the interactive resubmission forms available on our Web server may be used for email, web-based-upload, and hard-copy transmission of modified manuscripts. These forms should also be used when a manuscript previously submitted to one APS journal is being submitted in modified form to another one (typically a former *Physical Review Letters* submission being submitted to *Physical Review*). Resubmissions from e-print archives are not yet supported. If you do not use the forms, please include a summary of changes made and a brief response to all recommendations and criticisms; state whether or not the figures have been modified, and supply new PostScript or scanner-reproducible figures if there have been such changes; and update any other information (e.g., address and communication information) that has changed since initial submission.

If the manuscript was originally submitted electronically, please avoid resubmission by conventional means (paper, postal mail); continue to use one of the electronic modes. When **resubmitting electronically**, please send the complete file for the text if there have been any changes. Send email resubmissions to pretex@aps.org, and use as the subject of the message ''resub'' followed by the manuscript code number and the last name of the first author; for example, ''resub EF1234 Smith'' or ''resub ef1234 smith.'' Include the filled-out resubmission form (or equivalent information as described above) as the first part of the message. For **resubmission by conventional mail**, please send four copies of a complete modified manuscript, and include the form or equivalent information.

For **general format and style** consult recent issues of this journal and the *Physical Review Style and Notation Guide*, available via ftp to aps.org in the /pub/jrnls directory as the style_guide files (include filename suffix .pdf, .ps, or .tex). Additional style guidelines can be found in the Fourth Edition of the *AIP Style Manual*, which may be obtained for $10.00 (prepaid) from Springer-Verlag, P.O. Box 2485, Secaucus, NJ 07096-2485.

Readability of the journal is an important consideration. Authors are urged to take special care in assuring that their manuscripts are well-organized and clearly written in good scientific English. **Accessibility** of papers is a matter of significant concern, and at least the abstract and introduction of each article should be written so as to be understandable by a broad spectrum of readers.

The **title** should be concise but informative enough to facilitate information retrieval. The **abstract** should be self-contained (contain no footnotes). It should be adequate as an index (giving all subjects, major and minor, about which new information is given) and as a summary (giving the conclu-

sions and all results of general interest in the article). It should be about 5% of the length of the article, but less than 500 words.

Notation should be clear, compact, and consistent with standard usage. **Equations** should be neatly formatted, punctuated, and aligned to bring out their structure, and numbered on the right. (a) Diacritical marks (tildes, etc.) can be put over any symbol, including indices. (b) Three-vectors are generally set in roman boldface type. More general vectors, matrices, etc., are usually set in lightface italic type, although boldface may alternatively be used. (c) Be careful when using the solidus (/) in fractions. For example, $1/2a$ means $1/(2a)$, not $(1/2)a$. Use appropriate bracketing if needed to ensure clarity.

References and footnotes to text material must be combined in a single list, numbered consecutively in their order of first appearance in the paper, and placed in a double-spaced list at the end of the text material. They should be designated and cited in text by on-line Arabic numerals in square brackets. Footnotes within tables should be designated by lower-case letter superscripts and given at the end of the table.

For the proper form for references, see the *Physical Review Style and Notation Guide* and recent issues of this journal. The names of all authors of works cited should be given in the references, unless the number of authors is greater than three; in this case, the first author's name followed by *et al.* is allowed. When reference is made to internal reports or other items not available in the open literature, it is the responsibility of the author to provide sufficient information to enable the reader to obtain a copy of the referenced material. References to classified reports or other documents with restricted circulation should be avoided. It is important to confirm the accuracy of bibliographic information in references. This has become more important now that the journal is online. Hyperlinks will be programmed to enable readers to ''click'' on references and jump directly to the material cited. If your reference citations are incorrect or incomplete (e.g., missing author name, or an incorrect volume number or page), the associated hyperlinks may fail, and the usefulness of your paper in the online environment may be diminished. Since at the present time such links work only from the reference section, work cited anywhere in the paper, including in figure and table captions and in ''Note(s) added,'' should be included in the reference section.

Footnotes to an author's name or address should be limited to those useful for location of, or communication with, an author. Footnotes giving electronic addresses (e.g., email, fax, or Web) or a corresponding author are encouraged. All information concerning research support should appear in the acknowledgments.

Separate **tables** (numbered in the order of their first appearance) should be used for all but the simplest tabular material; they must have captions, which should make the tables intelligible without reference to the text. The structure should be clear, with simple column headings giving all units.

The decision on whether results should be published in long tables depends on the precision of the data, i.e., whether they can be read accurately enough from a figure, and on how many readers are likely to use the numbers relative to the space needed in the journal. If additional numerical data can be obtained from a data center, from the author, or from another source either as tables or on tape, indicate how and in what format they can be obtained.

Figures should be planned for the column width of the *Physical Review* (approximately 8.6 cm, or $3\frac{3}{8}$ in.). In some cases where the figures contain a great deal of detail, $1\frac{1}{2}$ or 2 columns may be used. Wasted space at the top and bottom should be avoided. Carefully prepared figures, suitable for digital scanning, are required (original India-ink drawings or glossy prints; computer-generated figures, if of sufficient quality, are acceptable). Figures must have a clear background and unbroken lines with as much black-white contrast as possible. *Final-journal-size* originals or prints are preferable to oversized originals. Avoid small open symbols which tend to fill in upon reproduction, small dots and decimal points, and shading or cross-hatching that is not coarse enough to withstand reproduction. The lettering and plotted points on the figures should be large and clear enough that they will be legible on the journal pages (final journal size of lettering should be at least 2 mm). Inconsistently large or too heavy lettering should be avoided. Line weights should be consistent throughout a figure, with a final line weight of at least 0.18 mm (0.5 point). Figures reproduced directly from an automatic plotter or computer printer must have lettering of the correct size and style (e.g., MeV instead of MEV, unslashed zeros) and curves that are smooth and of sufficient line weight to allow suitable reproduction. The resolution of the drawing software and the output device should be set as high as possible (preferably 600 dpi or higher). Very fine lines in laser-generated illustrations will disappear under scanning. Photographs of apparatus are unacceptable and should be replaced by good schematic diagrams.

Photographic (continuous tone) material is **screened** (''halftoned'') within our production process. Avoid submitting prescreened prints of photographic material; reproduction of such figures is then seldom satisfactory. There is a risk of moiré patterns appearing in the final product. Laser-printer renditions of continuous-tone data are similarly problematic, since they are effectively prescreened. Please submit such figures electronically as PostScript files (one image per file). There are greater possibilities for successful reproduction in the journal when these data are processed directly rather than

via scanning of hard-copy renditions. Alternatively, supply glossy or matte-finish photographs instead, if available. Otherwise, choose the highest resolution possible and laser print the figure at its final published size.

Figures should be numbered in the order in which they are cited in the text. The original figures, as well as the copies supplied for review purposes, should be identified on the *front* (well outside the image area) by the number, the name of the first author, and the journal. An indication, e.g., ''TOP,'' of the intended orientation of a figure is helpful, especially in ambiguous cases. Be advised that the scanner reproduces all flaws (e.g., correction fluid, tape, smudges, writing on the back of the figure). Each figure must have its own caption; list captions on a separate sheet. Groups of figures that share a common (single) caption must be labeled ''(a), (b), (c),'' etc. It is preferable that all parts of a figure be submitted as a single piece. The figure should have properly labeled axes with correctly abbreviated units. Use the form R (10^3 Ω), not R$\times 10^3$ ohms. For complete instructions see the *Physical Review Style and Notation Guide* and the *AIP Style Manual*.

Some figures might be more effective in **color**. This option is available; price schedules can be obtained from the Editorial Office at Ridge. The cost of publishing illustrations in color must be borne in full by the respective authors and their institutions. Authors who wish to avail themselves of this option should provide 35-mm slides or transparencies, or high-quality glossy prints, which should be close to the final size expected for publication. (Negatives are not acceptable.) Polaroid color prints should be avoided. Artwork must be flexible. If submitting slides, please note that they will be removed from their jackets for the color separator. In some cases, printing requirements will prevent figures from being located in the most preferred position. To alert readers of monochrome reproductions of the article that the archive figure is in color, begin the caption with ''(Color).'' Be advised that production of an editorially accepted paper that contains color can begin only after a properly completed color-illustration authorization form has been received from the author.

The detail on some figures (such as continuous-tone photographs or color figures) is lost on photocopying. Therefore, duplicate sets of the originals of such figures must be attached to each copy of the manuscript.

In order to **reproduce** figures, tables, etc., from another journal, authors must show that they have complied with the requirements of the publisher of the other journal, possibly including written agreement of both publisher and author of the originally published work. (If the original journal is published by APS, only the written agreement of the original author is required to reproduce a few figures or tables.)