PHYSICAL REVIEW C
INFORMATION FOR CONTRIBUTORS
(Revised January 2002)

Manuscripts which report the results of research in nuclear physics and related fields may be submitted to *Physical Review C*. The manuscripts must contain new results and not be in editorial process at another journal. (For details, see ''*Physical Review C* Editorial Policies and Practices '' in this issue.)

Articles published in *Physical Review C* are grouped under **headings** in the table of contents. The headings now used are as follows:

Nucleon-Nucleon Interaction, Few-Body Systems
Nuclear Structure
Nuclear Reactions
Relativistic Nuclear Collisions
Hadronic Physics and QCD
Electroweak Interaction, Symmetries
Nuclear Astrophysics

Authors should suggest the headings which are most appropriate.

This journal, and more detailed information about it, can be found on the **World Wide Web** at the URL http://prc.aps.org. Prospective authors are particularly advised to consult the information accessible via the Authors and Manuscript Submission subpages. Those looking for a specific known file may find it more convenient to consult the alphabetical listing available at the Author Forms subpage of http://forms.aps.org.

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. Web or e-print submission is strongly preferred. Interactive submission forms are an integral part of the submission process for the e-print and Web modes. 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. Authors submitting via email or conventional mail should download the form available (in ASCII or PDF format) via the Author Forms subpage of forms.aps.org, fill it out, and include it with their submission; though less efficient than the interactive Web form, this will aid in ensuring the completeness of the submission, and assist processing.

If you do not use the submission forms noted above, your submission letter should specify the **author** to whom correspondence should be addressed, and give all available communications information for this individual (postal and electronic-mail addresses, phone and fax numbers). Please specify journal and section to which the paper is submitted, and give Physics and Astronomy Classification Scheme® (PACS) index categories which are available via the APS Web server at http://publish.aps.org/PACS/. These categories are used in preparing the annual subject index.

For detailed information about **electronic submissions**, see http://publish.aps.org/ESUB/. Properly prepared electronic submissions are **exempt from publication charges**. Those that use APS macro packages may qualify for the compuscript production program, under which author-supplied files are converted directly to production format and coding, rather than being rekeyed for publication. Receipt of an electronic submission will be acknowledged by email within 24 hours. Copies of the manuscript should not be sent by conventional mail 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. The figures may be sent electronically (preferred) or by overnight mail, or review-quality figures may be sent by fax while the ''originals'' are sent by conventional or overnight mail as soon as possible. Refer to the online documentation for more detailed instructions.

Manuscripts sent by **conventional mail** should be submitted in triplicate to the Editor, Physical Review C, 1 Research Road, Box 9000, Ridge, New York 11961-9000. Manuscripts should be double spaced (about 6 mm of space between lines) with ample margins, on white letter-sized paper. Poor copies and unclear or excessive handwritten inserts are not acceptable.

Hard-copy submissions of manuscripts and figures are *not routinely returned* to authors. Authors should indicate (preferably on initial submittal) if they want hard copies of the manuscript and/or figures returned (e.g., when correspondence is sent to the authors during the editorial process, and/or after a final decision has been made).

A **copyright-transfer** form should be sent as part of your 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. Authors submitting via the Web may fill out and submit the form electronically as part of the submission process. Authors submitting via email or conventional mail can find the form at

the back of the 3 December 2001 issue of *Physical Review Letters*, or on the Web via the Author Forms subpage of forms.aps.org; a signed hard copy should be sent to the Editorial Office (we cannot accept forms sent via email). Be sure to use the latest (2/01 or later) version of the form.

The Division of Nuclear Physics of the APS requests that authors provide a **Keyword Abstract**. A request will be mailed to the authors of experimental papers; the Keyword Abstract should be forwarded to the National Nuclear Data Center.

Manuscripts should be written in scientific English, in a style consistent with that of the journal. It is not possible for the editorial office to undertake extensive corrections of manuscripts, due to time constraints and the risk that the authors' meaning might be distorted. Manuscripts requiring extensive corrections are therefore returned to the authors. For this reason, authors whose native language is not English are urged to seek help from a native English speaker. For **general format and style** consult recent issues of this journal and the *Physical Review Style and Notation Guide* at http://publish.aps.org/STYLE/. Additional style guidelines can be found in the Fourth Edition of the *AIP Style Manual*, available at http://www.aip.org/pubservs/style.html.

When a manuscript is **resubmitted**, please include a summary of changes made and a brief response to all recommendations and criticisms. The interactive resubmission forms available on our Web server may be used for electronic-mail, Web-upload, and hard-copy transmission of modified manuscripts and figures. These forms should also be used when a manuscript previously submitted to one APS journal is resubmitted to another. When **resubmitting electronically**, send the complete file for the text if there have been any changes. Please refer to the online documentation for more detailed instructions. If the resubmission is by conventional mail, send four copies of the revised manuscript (with figures) and include the resubmission form or equivalent information. For any resubmission, please state whether or not the figures have been modified, and supply new PostScript-formatted figures or scanner-reproducible figures if there have been such changes. It is only necessary to resend the ''original'' figures if the previous versions are no longer valid. Please update any other information (e.g., address and communication information) that has changed or will change since initial submission.

The writing of the **title** deserves special care. It should convey the greatest amount of information in the smallest number of words. Words that do not carry information, such as ''The...'', ''A...'', ''On...'', ''Investigation of...'', ''Study of...'', should be omitted. For manuscripts submitted to the Comments section, ''Comment on...'' followed by the title of the paper to which the Comment refers is, however, good practice. Do not use in the title words that praise the quality of the work (precise, important, accurate), the name of the accelerator or type of detector used, names of people or places, coined words or acronyms, ''More about...'', ''...revisited'', or dangling participles (...using...). Do not use serial numbers in titles unless the number is followed by a specific title, such as ''Inelastic scattering of protons. IV. Coupled channels analyses.'' If you wish to use a serial number, please provide information on the other published articles in the series.

The names of **authors** may be listed in any order in the byline at the beginning of a paper. The author who submits the paper is responsible for ensuring that all coauthors have approved the paper and for checking that the form of each name (e.g., initials versus full names) is that normally used by the author.

Affiliations of authors should be given without abbreviation. (Use Massachusetts Institute of Technology, not MIT.) Give the city, state, and zip code for U.S. addresses; add the country for other addresses. Affiliations must be institutions, not conferences, collaborations, or temporary meeting places.

If the authors are at different institutions, they may be grouped by institution with the name of the institution following each group. If the authors are not grouped by institution, the names of institutions may be repeated following the appropriate authors or groups of authors. If this becomes cumbersome, the names of institutions may be listed following the list of authors. Each author's name should then be followed by a superscript number (or numbers) which refers to a similar superscript number preceding the appropriate institution (or institutions). Normally, the most concise presentation is preferred.

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) of a corresponding author are encouraged. All information concerning research support should appear in the acknowledgments. Footnotes to an author's name which describe the author's position are not acceptable.

Every paper must have an **abstract**. It should be about 5% of the length of the article, but less than 500 words. It should state all subjects about which new information is given and the conclusions and results. For experimental papers it should specify clearly what quantities were measured, what nuclides were studied at what energies. It should not contain footnotes, coined words, or acronyms which are not explained.

Physical Review C tries to follow the recommendations on **symbols and units** of the International Union of Pure and Applied Physics (IUPAP) and of the National Institute of Standards and Technology. Metric units (preferably SI), not British units, are used, unless the British unit is part of the name of an object.

Recommended abbreviations for frequently used terms are listed below along with some common misuse.

Use	**Do Not Use**
μm	μ
nm	mμ
fm	F (F is for farad)
g	gm
A	amp
K	°K
sr	Sr, ster, str
u	amu
cm^3	cc
deg	DEG, DEG., deg.
keV	KEV, KeV
MeV	Mev, MEV
MeV/nucleon	MeV/u, MeV/amu, MeV/*A*
μ_N	n.m.
c.m. (=center of mass)	CM
arb. units	a.u. (a.u. is for atomic units)

Physical Review C follows the recommendations of the S.U.N. Commission of IUPAP on the symbols to be used for nuclides and their states. The nucleon number (mass number) of a nuclide is shown as a left superscript (^{14}N). A right superscript is used for indicating a state of ionization (Ca^{2+}) or an excited state ($^{110}Ag^{m}$,$^{14}N^{*}$). A right subscript is used for indicating the number of atoms in a molecule ($^{14}N_2$). For bombarding particles, *n, p, d, t, h,* and α may be used, but not τ. For other bombarding particles, only the usual symbols ^{6}Li, ^{12}C, ... should be used. For target nuclides, use ^{1}H, ^{2}H, ^{3}H, ^{3}He, ^{4}He, ... Do not use D, T, ...

The preferred notation for a differential **cross section** is $\sigma(\theta)$, $\sigma(E,\theta)$, i.e., the angle or energy should be shown as an argument. The derivative notation $d^2\sigma/d\Omega\, dE$ is acceptable; $d^2\sigma$ by itself or $d\sigma/d\Omega\, dE$ is not. The notation *dM/dA* or *ds/dZ* is acceptable when it refers to a mathematical relationship, such as the semiempirical mass formula, but not for the characterization of data, since *A* and *Z* are not continuous.

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, 1/2*a* means 1/(2*a*), not (1/2)*a*. Use appropriate bracketing if needed to ensure clarity.

References cited in text material must be numbered in order of their first citation, and should appear in a separate double-spaced list at the end of the text. They should be designated by on-line Arabic numerals enclosed in square brackets. **Footnotes** (for subsidiary remarks, not for references) may be placed at the bottoms of printed pages. Such footnotes to text material should be designated by superscript numerals, numbered consecutively throughout the paper, and placed at the bottoms of the manuscript pages on which they are cited. Authors who do not wish to use this option should combine references and footnotes in a single list, designated by on-line numerals in square brackets, numbered consecutively in order of first citation, and placed at the end of the text. References and footnotes within tables should be designated by superscript lower-case roman letters and given at the end of the table.

In preparing the **list of references** for papers submitted to *Physical Review C* the author should be guided by the *Physical Review Style and Notation Guide*, especially Table I and the list of Journal Title Abbreviations, and by the corresponding material in the *AIP Style Manual*. The following describes the practices of *Physical Review C*:

et al. The use of *et al.* (no comma before *et*) is encouraged in the body of the paper, but discouraged in the references. The names of all authors should be given in the references, unless the number of authors is greater than **ten**.

(in press) means that the paper has been accepted for publication in a journal (or a conference proceedings). The name of the journal must be specified. If the paper has been published when the author receives the proofs, the reference should be updated in proof.

(submitted or to be submitted) means that the paper has been submitted or will shortly be submitted for publication. The name of the journal, book, or conference proceedings must be specified.

(unpublished) means that the information is unavailable in printed form. Ph.D. theses need not be marked (unpublished), since copies can be purchased.

Conference Proceedings. Name, place, and year of the conference should be specified. Specify the editors and publisher if possible. Give page number.

Preprints and Reports (electronic or hard copy). Give name of laboratory, preprint or report number, and year. Give the title if possible and especially if a preprint or report number is not available.

Books. Give publisher, year, page number.

Journal references. Phys. Rev. C **20**, 195 (1979). Nucl. Phys. **A249,** 253 (1978). (Note difference.) For Annals of Physics use Ann. Phys. (N.Y.).

(private communication) means that the information is not available either in published or report form and acknowledges the receipt of information from another source. References to private communications in which the name of one of the authors appears are not acceptable.

References to papers published in peer-reviewed journals are considered primary references. References to e-print archives should not be used in place of primary references.

It is important to confirm the accuracy of bibliographic information in references. This has become more important now that the journal is online; establishing functional **hyperlinks** from reference lists to bibliographic and document databases depends on the accuracy of the data contained in the anchor reference. 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.

Acknowledgments of support must be placed in an acknowledgments paragraph at the end of the text of a manuscript. Not all types of acknowledgments are appropriate for the *Physical Review*. We do not include acknowledgments to those who helped in the preparation of the document being published; to referees or editors (unless they were involved before the paper was first written); to those who contributed general encouragement (family, friends) or services which were not directly part of the research. References to positions, titles, and awards are inappropriate as are dates associated with awards. Examples of suitable acknowledgments are thanks to other scientists for scientific guidance given in discussions or by the communication of results, mention of technical assistants who helped in the actual research, and citation of funding agencies which sponsored the work. Acknowledgments should be a simple statement of thanks for help and may not be a dedication or memorial. Acknowledgments to people should precede those of financial support.

Separate **tables** (numbered in the order of their appearance) should be used for all but the simplest tabular material; they should have captions that make the tables intelligible without reference to the text. Units should be given in the column headings. 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 experimental results are likely to be used as reference values by other authors, the publication of the numbers is desirable. Material more extensive than is appropriate for the journal article, or of special types (e.g., color figures, multimedia, program files) may be deposited in the Electronic Physics Auxiliary Publication Service (EPAPS) of the American Institute of Physics. Information about EPAPS is available via the Authors subpage of prc.aps.org, in the Manuscript Preparation section. If additional numerical data can be obtained from a data center, from the author, or another source, either as tables or in electronic form, indicate how and in what format they can be obtained.

Figures should be planned for the column width (8.6 cm or $3\frac{3}{8}$ in.) of the journal. If the detail shown requires it, 1.5 or 2 columns may be used. A note should be left on or with such figures. *Final-journal-size* originals or prints are preferable to oversized originals. Authors are encouraged to submit all figures electronically, even if the text of the manuscript is not submitted electronically; refer to the online instructions for more details. Figures submitted on paper should be of high quality and suitable for digital scanning, which is done at 600 or 1200 dpi depending on the level of detail; original ink drawings or glossy prints are acceptable. Be advised that the scanner reproduces all imperfections (e.g., correction fluid, tape, smudges, writing on the back of the figure, etc.). All figures must be prepared so that the details can be seen after reproduction. They must have a clear background and unbroken lines with as much black-white contrast as possible. The symbol width and lettering height on the journal page should be at least 2 mm. Avoid small open symbols that tend to fill in, small dots and decimal points, and shading or crosshatching that is not coarse enough to withstand reproduction. Curves should be smooth; curves and lines should have consistent line widths of sufficient weight [final weight of at least 0.18 mm (0.5 point)]. The resolution of the drawing software and output device should be set as high as possible (preferably 600 dpi or higher).

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Avoid submitting prescreened prints of photographic material or laser-printed renditions of continuous-tone data; reproduction of such figures is seldom satisfactory and there is a risk of moiré patterns appearing in the final product. If PostScript files are not available, supply glossy or matte-finish photographs or laser prints at the highest resolution possible and in the final published size.

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The relation of the paper to **previously published** work should be explained clearly. This should include the work of other authors and previously published work of the present authors, including meeting abstracts and conference reports. If the present results correct, supplement, or supersede previous results, this should be stated. (Preprints and internal laboratory reports are not considered publications.) Indicate which results are new, as distinguished from results obtained previously.

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.)

Enough information about the **apparatus** and methods should be presented to permit evaluation of the procedure. For example, for a scattering experiment, give relevant dimensions, target thickness and composition, energy resolution, and angular resolution. If an accelerator was used, it should be identified.

An example of **data** should be presented (such as an energy distribution, time-of-flight spectrum, or coincidence spectrum) to show the quality of the data. If results depend on theoretical assumptions, state what the assumptions are. If the measurement is relative to a standard, such as an energy or cross section, state what reference value was used. If results depend on a sign convention, state the convention and give references.

Specify **uncertainties**. Distinguish statistical and other errors. In the case of measurements relative to a standard, state whether the error includes the error in the standard.