Physical Review Letters Evaluation Committee Report

October, 2004

I. Executive Summary

The committee has been charged to evaluate the quality of the operation of Physical Review Letters (PRL) and to help define the fundamental role the journal should play in the physics publishing system. The last review of PRL occurred in 1991. The present Evaluation Committee consists of the following members:

Eric Cornell	University of Colorado at Boulder
Steve Cowley	University of California at Los Angeles and Imperial College, London
Doon Gibbs	Brookhaven National Laboratories
Martin Goldman	University of Colorado at Boulder (Chair)
Steven Kivelson	Stanford University and University of California at Los Angeles
Helen Quinn	SLAC, Stanford University
Susan Seestrom	Los Alamos National Laboratories
John Wilkins	Ohio State University
Katsu Ushioda	Japan Institute of Advanced Science and Technology

Physical Review Letters remains one of the world's prime journals in physics although significant competition now comes from Science, Nature, archival preprint servers such as arXiv and other journals, particularly in certain physics subdisciplines. During the last decade PRL has undergone a major transformation by taking good advantage of electronic publishing and by pioneering advances such as PROLA, the online archive that contains all volumes since the inception of Physical Review over a century ago. These advances as well as the establishment of online services such as PR Focus, which highlight and popularize articles in PRL have been due largely to the initiative and perseverance of the leadership and staff of the Editorial Office.

Editor and Chairman of the Divisional Associate Editors Jack Sandweiss has been extremely effective and flexible in formulating and exercising policies for Phys. Rev. Letters. His high stature as a physicist, his diligence and energy in reading Phys. Rev. Letters articles and his good judgment in answering appeals have earned him the respect and praise of his staff. We thank him and the other Editors of Phys. Rev. Letters, Stanley Brown, Reinhardt Schuhmann and George Basbas for their cooperation, help and advice in the preparation of this report.

Submissions to Physical Review Letters have been rising rapidly with manuscript submissions almost doubling since the early 1990s. Submissions from outside the United States are by far in the majority. Although the number of published papers has increased, the acceptance rate has dropped steadily. Increased submissions have meant increased workloads for the editors and their staff. The committee has observed that multiple reviews of bad or marginal papers continue to demand too much editor time.

The committee reviewed the editors files on a selection of 50 refereed PRL papers, some accepted, others rejected. This confirmed the notion that multiple reviews of bad or marginal papers consume a great deal of referee and editor time and that a policy was needed for faster and more decisive rejection of bad papers. In addition, the committee noted that the present requirement that papers submitted to PRL contain an introduction that can be read by physicists in other fields is generally not met. While many referees labored to produce valuable reports others did not submit particularly useful reports.

In response to these and other issues the committee has made recommendations for better training of referees, for enhancing the role of editors, and for broadening the audience for PRL and focusing more public and scientific attention on its best articles. The following recommendations are offered:

- *Improve refereeing:*

Educate referees more vigorously on how to submit referee reports useful to the editors. Specific suggestions here include the creation of a Library of Exemplary Referee Reports, the holding of referee workshops, more vigorous interaction of editors and others with the physics community, and educating referees to identify more of the speculative exciting papers that advance science even if not all concerns about validity can be answered. Develop a pool of new *younger* referees mentored by experienced first-rate referees.

Take proactive steps to *encourage* the best referees.

- *Address the issue of rapidly rising submissions to PRL:*

Encourage the *editorial staff* to reject more papers *before* sending them to referees. Up to 20-25% of papers might be rejected. The expectation is that this process would ultimately reduce the editorial workload by reducing multiple reviews.

Expand the editorial staff in underrepresented geographical areas. An editorial presence in certain countries might help identify outstanding papers from emerging sources of scientific activity and produce a pool of effective local referees.

Encourage author self-discipline in determining what to submit.

- *Increase the broad appeal of PRL:*

The introductory paragraph of PRL, which is required to address physicists who are non-specialists in the field, has not been successful at this task. The format of submitted and published PRL manuscripts should be changed to include a second *popular* abstract, which describes the content of the paper in a form accessible to a wider audience of physicists than the does the current introductory paragraph. This abstract would ideally be written at a level only slightly more technical than the articles in *Physical Review Focus*. Practical implementation of this recommendation may require that additional professional writers be added to the staff.

The APS online journal *Physical Review Focus* should continue its important activities in popularizing articles in PRL. The committee congratulates Editor David Ehrenstein for significantly broadening interest in PRL by the general public and press. The AIP online journal, *Physics News Update* is another successful vehicle for broadening interest in articles across all major physics journals, including PRL.

- *Identify and focus attention on important PRL papers*

The editors are encouraged by the committee to create a new online feature of *reviews of noteworthy PRL papers.* This "*Perspectives*" or "*Highlights*" (name to be determined) feature could be a section of PRL. It would be analogous to the "News and Views" section in Nature. Here, short articles written by distinguished scientists and published on a regular basis would provide a more generally accessible explanation of the importance and implications of recently published articles in Physical Review Letters.

- *Miscellaneous additional recommendations:*

The handling of internet-posted manuscripts in relation to PRL articles should follow the custom and wishes of particular physics subdisciplines. Certain subdisciplines may consider internet-posted manuscripts as prior publications for purposes of evaluating the acceptability of a PRL while others may not. A uniform policy is *not* recommended.

The Committee finds that *Physical Review Comments* is not working as well as it should. There are long delays while authors and comment submitters dispute with each other. A new policy is recommended. The editors should consider abandoning the attempt to produce a matched *Comment* and *Response*, in which each respective argument is rebutted or "prebutted." No particular effort should be made to ensure that the *Response* appears in the same number as the *Comment*. A forward link could always be supplied from the archival online Comment to the eventual Response. This should eliminate long and unnecessary delays in the publication of *Comments*.

The Editors should reconsider the division of Condensed Matter Physics contributions to PRL into the present two categories. One member of the committee finds the present division according to "Structure etc." and "Electronic Properties etc." to be confusing and archaic, while another finds this division to be too coarse-grained.

- *Committee response to its charge.*

In the charge to the committee the question was raised "What is the proper role of Physical Review Letters in the physics publishing system?" The committee was asked to choose from among several possible models. In response to this charge the committee acknowledges the present mission statement for PRL while endorsing a new model. In this model PRL publishes the most important work in most fields of physics at a level such that a physicist in a given field can keep abreast of the major developments in his or her field by reading it. In addition a second *popular* abstract is written so that *a more general audience*

of non-specialist physicists can understand (at some appropriate level) what the paper addresses and what was accomplished.

II. Findings

A. Present state of Physical Review Letters

- **Physical Review Letters remains one of the world's prime journals in physics, although there is significant competition**

  Physical Review Letters (PRL) is viewed with respect as a source of some of the most important new research in physics. Its reputation as *the* leading journal for cutting edge short publications is, however, not uniform across all physics disciplines In areas such as Atomic and Molecular Physics, Plasma Physics, Beam Physics, Space Physics, Experimental High Energy Physics and in parts of Condensed Matter Physics it is considered by many to be *the* top physics journal for important short communications.

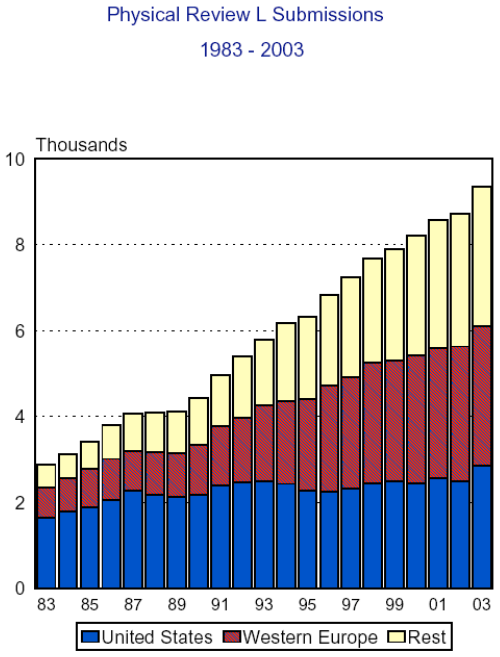
  In other areas publication in Nature and Science is gaining in prestige. These journals are increasingly perceived as containing some of the best papers in Condensed Matter and other fields of physics, partly because the small number of papers published conveys the impression of high quality. Aggressive competition from Nature will intensify. The new journal Nature Physics will be launched next year with the objective of "seizing the commanding heights of the physics publishing landscape." (From advertisement for editorial staff for Nature Physics.)

  In High Energy Theoretical physics the best new *nonrefereed* research results can be found in *Online Preprint Archives*, such as *arXiv*, which is the current preferred vehicle for publication in String Theory and much of High Energy Theory.

  Some of the most important *refereed* research in Particle Physics and Nuclear Physics appears in *Physics Letters B*. For example, a breakdown of the top 25 recent articles in the area of Neutrino Physics reveals the following distribution: 10 out of the 25 were published in Physics Letters B, 7 in PRL, 6 in other APS journals, 1 in Nature, and 1 in Ap J. (from ISI Essential Science Indicators, published by Thomson)

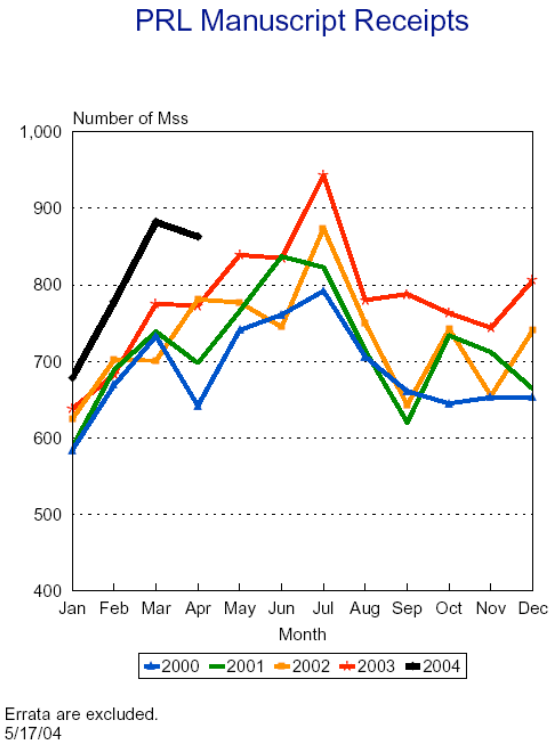
  In response to these findings the committee recommends measures for Physical Review Letters to adopt which are aimed at improving its competitive position (see Section III, *Recommendations*).

- **Changes in PRL**



The last report of a PRL Review Panel came out 13 years ago, in August of 1991. Since then there have been many changes in PRL and other APS journals and in physics publishing in general. The chart at left shows that the yearly number of submissions to PRL has almost doubled since then. The balance between U.S. submissions to PRL and submissions from elsewhere in 1991 has tilted decisively away from the U.S. and towards Western Europe and the rest of the world. This trend is likely to continue. The U.S. submissions now constitute only about one-third of overall submissions. Overall acceptance rates (not shown) have fallen steadily, from 39% in 1993 to 34% in 2003. Acceptance rates from some foreign countries are disproportionately low.

In 1994 the *Physical Review* set up their first website. Since then, all *Physical Review* publications have been placed on-line. The editorial office also inaugurated *PROLA*, the *Physical Review On-Line Archive*. As a result all articles in Phys. Rev. Letters since the inception of the journal can now be found online. The online versions of Phys. Rev. Letters are now the *archived* versions.



- **Electronic publishing: Its impact on Phys. Rev. Letters and future implications** The onset of the "information age" and the transition to electronic publishing have had a profound effect on the accessibility of physics research to the scientific community. New research can be put online as soon as finished; in some disciplines unrefereed archival preprint servers are heavily employed. Online articles can be downloaded as PDF files and stored on hard drives or CDs for readers to bring with them anywhere in the world. Online and portable document files can be printed at will and read without benefit of a subscription to a paper version of the journal; the length of articles is therefore no longer bound by the constraints of paper cost and weight. Links to references in articles online now facilitate instant access to associated online articles by the author and others. Multimedia material such as color images, movies and even interactive simulations is increasingly made "part of" the online article, which has replaced the paper journal as the archived version.

  A recent report, the APS task force on Electronic Information Systems (The Loken Report II), has noted these changes and made forecasts and recommendations for the future of physics publishing. There is no consensus in the Committee as to whether or not to endorse these recommendations. It is hard to predict the eventual specific impact of the electronic publishing revolution on Phys. Rev. Letters in the future although it is clear that significant change will occur.

- **The workload of PRL editors remains high, although it has changed in character**

  Submissions to Physical Review Letters are rising rapidly, although the number of manuscripts handled per editor per year has decreased. 5,515 papers were submitted in 1993 and 8,458 in 2002. Manuscript submissions to PRL for 2004 are projected at 9878. Although the number of papers published has increased, the acceptance rate has fallen steadily from 39% in 1993 to 34% in 2002. Neither the rate of increase of submissions nor the rate of decrease of acceptances shows signs of changing. In some ways, the editorial system has handled these stresses well. With various factors weighted in, the number of manuscripts handled *per editor per year* for 2004 is estimated by Stanley Brown, Editorial Director at around 980. This is to be compared with (similarly arrived at) figures of 1040 manuscripts per editor in 2001 and around 1200 manuscripts per editor in 1998 and 1995. Hence, the number of manuscripts handled per editor has decreased. This reduction is due in part to an increase in FTEs.

    - The 2004 estimated number of manuscripts is based on projected submissions for 2004 of around 9900 (actual submissions for 2003 plus an assumed growth rate which is a weighted average of the growth in 2002 and in 2003), and the existing in-house and (fractional) remote editors (after subtracting a rough estimate of the time devoted to management and policy matters by the most senior editors). The (retroactive) estimates for earlier years are carried out in a similar manner.

  In spite of the lower number of manuscripts per editor, there has been an offsetting increase in the time necessary for an editor to adequately assess each paper with newly available improved software tools and to make decisions. The workload on editors has increased. In principle, the sophisticated new software tools enable editors to make better-informed choices regarding referees; to cross check certain factors; to check if the author has another paper in the system or submitted a similar paper that was rejected; to see who the referees were; to check their records and to go further if desired. These tools appear to *increase* the amount of time required to handle each manuscript. The perception is that they have led to better assessment of manuscripts but that the potential of the software is not being fully realized due to insufficient editorial staff. The editors and the committee see the pressure of rising submissions and the underutilization of improved software tools as significant problems that need to be addressed.

  Geographic variations in self-screening of submitted manuscripts have required increased editorial efforts. The overall quality of submissions as reflected in publication percentages shows significant *geographic* variations as newly active communities (in terms of submissions to PRL) have not developed the degree of self-screening that some more experienced author communities apparently apply to PRL submission. The committee discussed whether author education efforts to

encourage more appropriate choices for article submissions could alleviate some of the editorial burden.

B. Findings from committee review of files of reports on published and unpublished manuscripts

- **File-reading exercise**

  In order to better understand the process of refereeing from the perspective of the editors, the committee read a set of 50 files of a mixture of accepted and rejected manuscripts together with their associated referee reports and author replies. These were chosen by the editors in 10 different areas. Members of the committee together with one guest reader (Dr. Beverly Berger, then Chair of the Publication Oversight Committee) were each assigned 5 files to read and evaluate in one of the 10 areas. As a result of this file-reading the Committee formed an overall impression of the process and quality of refereeing, especially in difficult cases.

- **Observations concerning *PRL* files read by the committee.**

  While there were examples of outstanding referee work in recommending either acceptance or rejection, committee members felt that in some cases the refereeing could have been improved. More papers could have been turned down although it is time-consuming to reject papers due to the current policy of multiple reviews and appeals. Weak or vague referee reports make it difficult to turn down papers. Multiple reviews of bad or marginal papers consume the greatest amount of referee and editor time.

  Papers frequently do not have a broad enough appeal because they are aimed at narrow specialists. The introductory paragraphs are rarely understandable by non-specialists in the field. *PRL* publications are sometimes more aimed at validating highly technical work among competing groups or institutions or among tenure-seeking faculty, than informing a broad audience of physicists and non-physicists. Referee criteria for what constitutes PRL-worthy research results seem to vary by subfield. Referees apply what they perceive to be the common standard in their subfield with little reference to the stated PRL criteria. As one example, in experimental high-energy physics a measurement that gives a significant decrease in the standard error on a particular decay branching fraction can be a PRL publication, although it is difficult to argue that such results meet the broad interest criterion. Other subfields, such as plasma, laser and beam physics also seem to regard small incremental achievements as worthy of publication in PRL.

C. Other observations

- **Some physicists in the community claim that their more speculative papers are unduly delayed or turned down**

  Although many high-quality papers are published in PRL, there is limited anecdotal evidence that some good but speculative papers do not make the cut after being

refereed. At least one member of the committee has been told by colleagues that their best papers are unduly delayed or even rejected. This raises the question of whether this perception causes top authors to abandon Physical Review Letters for Nature, Science or another physics journal

III. Recommendations

- **The committee endorses the present PRL mission statement:**

  Physical Review Letters, published by the American Physical Society, is charged with providing rapid publication of short reports of important fundamental research in all fields of physics. The journal should provide its diverse readership with coverage of major advances in all aspects of physics and of developments with significant consequences across sub-disciplines. Letters should therefore be of broad interest.

- **In order to further the mission of PRL and address some of the issues described in Section II, *Findings,* the committee makes the following recommendations**

A. Recruit, train and commend superior referees

- **Background**

  The tradition of peer review introduced over 50 years ago continues to be a cornerstone of physics research, helping to assure its overall high quality worldwide. However, the committee has some reservations about the quality of peer review in PRL, as suggested, for example, by the results of the file-reading exercise (above). Review committees such as ours could make a hundred suggestions for procedural changes and more staff, but one cannot overestimate the importance of having a large number of informed *referees* willing to work hard and well for PRL. A journal rises or falls on the quality of its refereeing. Without talented, diligent referees interacting with first-rate editors, a refereed journal becomes indistinguishable from a preprint server.

  The most obvious function of the referees, of course, is to review and recommend manuscripts for publication. Less appreciated but almost as important is the work they do in helping authors improve the papers that are accepted into PRL. These two functions: *selection* of publishable manuscripts and possible *improvement* of manuscripts, turn out to be exactly the two places where PRL adds the most value, the two main reasons one submits one's best papers to PRL. With regard to *selection* there is a wide variation of the utility of reports, from inadequate to useful:

  - Inadequate reports: Much Editorial time is wasted every day when an editor tries to decide what to do with a manuscript for which he or she has two inadequate reports, with A saying, "*This paper is correct, and I think it is interesting and important to enough appear in PRL.*" And B saying "*This paper is correct, but lacks the necessary interest and import to appear in*

PRL." With reports like that, it is not surprising that the selection process winds up being "*stochastic*", and that manuscripts get sent out often to three or four referees.

- Good (useful) referee reports*:* Consider in contrast the following report*: "This paper is correct, but everything of interest it has to say was already said more eloquently in the following prior publications..."* or one that says *"I have my doubts about the rigor of the method the authors use here, but it represents such a fresh and creative way to understand this important problem that it should certainly be accepted..."* and then backs up the point-of-view with more detailed discussion. With such a report an editor has something he or she can really work with.

Editorial effort put into improving the pool of referee talent is effort that is applied directly to making the PRL product more valuable. To the extent this effort can be applied effectively, it could be the single most efficient way to improve PRL. With this in mind, we make the following recommendations

- **Recommendation 1: Educate referees more vigorously on how to submit good referee reports by using a variety of new methods:**
  - *Create a Library of Exemplary Referee Reports*: there is no one-size-fits all "good" referee report, but any PRL editor could collect a dozen or more examples of really useful reports, of varying lengths, levels of enthusiasm, style etc, to construct a library of (suitably redacted) good referee reports. Such reports would have words and sections which could reveal the author and paper blacked out or replaced with bracketed generalities. General comments, format and style and tone of such reports would be retained. This would be a very useful tool in referee education. The more varied in style and format the items in the "*Good Review Library*", the better. However the good reviews should *not* be used as fill-in-the-blank templates. Thought and creativity should be encouraged in reviews. Perhaps a second library, of mediocre ("*less useful*") reports, would be useful, as a study in contrast.
  - *Hold referee workshops* (e.g. at the big APS meetings): an editor would then give a presentation on what makes a good referee report, perhaps with examples from the *Libraries of Good and Bad* referee reports. It would be especially effective to direct some of these towards young and new referees (see below)
  - *Have Editors and others interact more vigorously with the physics community in a variety of ways:*
    - *by speaking at universities*, addressing authors as well as referees on the subject of refereeing. Many physics departments would be willing to have Departmental Colloquia on this subject
    - *by providing more articles* in APS News or Physics Today on subjects such as "*What makes a good referee?*"
    - by directing referees and authors to *relevant Websites* such as John Wilkins' *http://www.physics.ohio-state.edu/~wilkins/writing/Handouts/refereeing.html*

- *Educate referees to identify cutting edge papers* worth publishing even if their correctness cannot be definitively established. Referee training should emphasize that a stronger attempt be made to accept more of the speculative exciting papers that really move science forward.

- **<u>Recommendation 2</u>: Develop a pool of new younger referees armed with the advice of experienced first-rate referees through a variety of different means:**
  - Continue to keep track of which referees tend to send in particularly useful reports. Avoid punishing the good referees with an extra heavy work load, but explore ways of using their skills as *seed talent to recruit younger referees*. For instance:
  - *Referee mentoring*. Send a manuscript to an experienced referee who is known to turn out good reports, with the request that he or she not do the refereeing personally, but instead pass the job to a promising junior colleague. The experienced referee would be encouraged to have a look at the junior person's draft report and suggest ways that it can be made more incisive and useful for the editors.
  - *Aim referee workshop*s *at young researchers at the big APS meetings*. Offer free pizza and beer. Before they can get in the door, have them fill out a card that gives their contact info and areas of expertise. An editor would then lay out for the new generation the problems that PRL faces, trying to instill in them a sense of the importance to the field of good refereeing, and going over the Libraries of Good and Bad referee reports. Follow through immediately -- the editors should make a conscious effort to send, within a few weeks, a manuscript for review to each of the workshop attendees.

- **<u>Recommendation 3</u>: Take proactive steps to *encourage* the best referees**
  - Explore ways of rewarding good referees. We encourage the idea (already under consideration by the editors) of generating "letters of commendation" — a rare event that would only go out to particularly good referees. The aim is to have this perceived by the community as an exceptional honor — one that should be considered by faculties in connection with promotion and tenure reviews.
  - Another possible “reward” is to consider a page charge credit for the best referees.

B. Address the issue of rapidly rising submissions to PRL

- **Background**
  - See Section II-A for discussion of rising submissions.
- **<u>Recommendation 4</u>: The Committee urges the APS and the Publication Oversight Committee to encourage the Senior Editors and the Divisional Editors to reject more papers based on internal review and assessment, rather than sending them to external referees**
  - Allow and encourage the *editors* to reject a higher percentage of submitted papers *before* sending the papers out to referees. The editors have this authority now but do not reject many papers. The committee believes that the editors' judgment is generally good and they can consult the DAEs if necessary. The editors have said that they can increase rejections efficiently and fairly – specifically they have confirmed that they can identify accurately a fraction of papers that will almost certainly be rejected if sent to referees. Increased editor rejections should eventually speed up the processing of papers and the quality of the journal may even be improved. Hopefully, the number of long drawn out rejections should be reduced.
  - It is difficult to set a target percentage of papers to be rejected by editors – it ultimately depends on the comfort level of the staff – but discussions with the staff suggest it might increase to as much as 20-25% of submissions (divisional editors vary widely on the maximum number of papers they feel competent to reject). The Senior Editor of Phys. Rev. Letters has indicated a willingness to experiment with an increase in rejections and they should determine how many papers can, in fact, be rejected efficiently and fairly. An experiment with increased editor rejections will determine whether or not there is a net savings in time spent on substandard manuscripts.
  - An increase in editor rejections would reduce the workload only if appeals decline. In the case of rejection by an editor an appeal would be allowed to the DAE, who can uphold the rejection or recommend that the paper be refereed through the customary refereeing process. The right to appeal further (to as high a level as the Editor-in-Chief) should be at the discretion of the DAE. Outside advice may be sought by the DAE or editor if necessary. The DAE should be made aware of the difference between his/her normal responsibilities and the special task of helping the divisional editors weed out and reject substandard papers. Prolonged (e.g., years) of correspondence back and forth between authors who have been rejected by both the editor and DAE should be curtailed. Some authors don't give up easily and it will be hard for them to accept the editor's (or DAE's) judgment without an automatic external review.
  - At present, the editors identify exceptional papers for a rapid *fast track* review. The committee recommends that this should continue. Of special concern to the committee is that important (and some times radically new and "orthogonal")

papers not slip through the cracks. There is a need to include more of these papers to maintain the excitement and cutting edge quality of PRL

- **<u>Recommendation 5</u>: Expand the editorial staff**
  - We recommend an increase in local editorial staff in underrepresented geographical areas.
    - For example if an editorial presence were to be set up in an underrepresented country (say, China) this might help identify outstanding papers from an emerging source of increased scientific activity and help direct the best papers from this country towards PRL rather than competing journals, as well as to identify new and effective local PRL referees there.

- **<u>Recommendation 6</u>: Encourage author self-discipline in determining what to submit.**
  - Given the prestige of Physical Review Letters, it is perhaps surprising that submissions are not even higher. One reason they are not is the perception by many authors that only the best papers should be sent to (and accepted by) Physical Review Letters. Thus, *pre-selection* by the author is an important, even essential, part of the process. The decreasing acceptance rate certainly suggests authors — particularly authors new to PRL — are underestimating the required quality. Of course, the perception and reality of a high standard will be eroded if poor papers are accepted and excellent papers rejected – the temptation to "have a go" at getting every paper into PRL will increase. This is why it is essential that the quality of the editorial process be protected.
  - How do we increase the quality of self-selection? Submitting poor papers is potentially damaging to a scientist's reputation. However, this does not seem to be sufficient incentive in a world where the authors and the referees are unlikely to know each other. It is helpful when the editors address these issues in articles in *Physics Today* and other widely read physics magazines. The community needs to be constantly educated – indeed before serving on this committee some members had only a sketchy idea of the problem. Hopefully, a continued firmness from the editorial staff will bring a realization to the authors that the standards of PRL are high and are being upheld. Perhaps then the increase in submissions will reflect more publishable PRL articles.

C. Increase the broad appeal of Phys Rev. Letters

- **Background**

  It is noteworthy that the first recommendation of the last PRL Review Committee was that "each article should begin with one or more introductory paragraphs that state, in language understandable to the journal's broad readership, the issues it addresses and its primary achievements," and that this requirement "be enforced." (From 1991 Report). In reading a large number of PRL papers the present committee has found that very few, if any, authors meet the requirement of providing a general introduction that is readable by any physicist. Authors all seem to assume that their colleagues are more expert on all subfields of physics than is in fact the case (at least for our committee).

  Journals such as Nature and Science are increasingly valued and read by members of the physics community. Their popularity may arise from the perception that they are more accessible to the general public and press than PRL. It is not clear to the committee that Nature and Science articles are any better written or edited. Nonetheless, physicists' records of publication in such journals (as well as PRL) are commonly used by Physics Departments in hiring, promotion and tenure decisions and by funding agencies in grant decisions.

  Aggressive competition from Nature will intensify. The new journal Nature Physics will be launched next year with the objective of "seizing the commanding heights of the physics publishing landscape." (From advertisement for editorial staff for Nature Physics.) It will "contain not only research papers but also commentary analysis from the community, .. as well as addressing issues that physicists care about." In order to reach the same wider audience as Nature and Science we make the following recommendations for PRL:

- **<u>Recommendation 7</u>: The format of submitted and published PRL manuscripts should be changed to include a *second (popular) abstract* which describes the content of the paper in a less technical form accessible to a wider readership**
  - We recommend that the editors experiment with a change in the format of PRL papers. At present the introductory paragraph is required to include a description of the paper suitable for a general physicist reader. This requirement should be broadened and shifted from the introduction to a second abstract, which from here on will be referred to as the *popular abstract*. This abstract would be written at a level only slightly higher than the level of popular summaries of PRL articles in *Physical Review Focus*. It should place the work in its scientific context and state specifically what is the new contribution of this paper. Popular abstracts would be a new means, more effective than either the currently required initial-paragraph or normal abstract, for the general PRL readership (i.e., non-specialists) to identify PRL papers worthy of their attention.
    - Initially this new feature could be *optional*, though authors choosing not to submit a popular abstract would then still be required to have an

introduction in the initial paragraph of the paper intelligible to a physicist in any subdiscipline. *The editors and referees should more strictly require that the initial paragraph be effective in meeting this goal for authors choosing not to submit a popular abstract*.

- The committee's hope is that the popular abstract would eventually become a *standard requirement*, and that papers could be rejected if their popular abstract proved unsatisfactory. Referees could then use the popular abstract to determine whether or not the "general interest criterion" for publication in Physical Review Letters is satisfied.
- The consensus of the committee was that the popular abstract should be published as the first item in the paper and that the word-allowance for the popular abstract be 200 words. The committee recognizes the possibility of increased cost for the additional length of printed articles. (Some clever formatting may save "white space" e.g. putting the two abstract side by side.) Most committee members were not overly concerned about the issue of the size of the *printed* journal as nowadays most people download the articles from the online version of the journal. Policy decisions on issues such as the total page count of PRL including its new popular abstract would be left to the discretion of the editors.

- Although the Committee *strongly endorses* the idea of a second abstract, the Editors will want to consider the cost of implementation. The Editors and the Committee agree that many or even most authors might *not* be able to write an acceptable popular abstract. Increasing the staff of professional writers to carry out this task would require new FTEs and may lead to some delays in publication. Nevertheless, the Committee feels *strongly* that popular abstracts are likely to be cost-effective. Many authors would find a professionally-written abstract of their PRLs useful in other contexts, such as résumés and portfolios used for tenure decisions. In addition, one might reasonably expect that the press and media would occasionally be stimulated by popular abstracts to provide coverage of the research advances described in a PRL.
- *Phys. Rev. Focus* Editor David Ehrenstein and his staff have demonstrated that professional summaries of PRL articles can be very effective at communicating content to wide audiences (see next recommendation); they could be entrusted with the implementation of popular abstracts by an expanded workforce of technical writers. However, the Committee's recommendation in this and other areas is no more than advisory. The final decision on whether and how to implement popular abstracts is up to the Editors and the Publication Oversight Committee.

- **Recommendation 8: *Physical Review Focus* http://focus.aps.org/ has been a valuable innovation towards the goal of popularizing PRL and should continue to be supported by APS.**
  - This online APS service has served an extremely useful purpose in making the new research published in Physical Review Letters accessible to other scientists and the general public. The committee especially commends the work of Editor David Ehrenstein. The physics community should be encouraged to use *PR Focus* as an *educational tool* in popular lectures, colloquia and courses. *Physical Review Focus* should be considered as good publicity for PRL (and physics in general) rather than as a significant source of income. However *PR Focus* might be able to *generate some revenue* by allowing some commercial ads, such as scientific textbooks or instruments or through government funding as an outreach/education effort.
  - In addition to *Physical Review Focus*, another good model for promoting attention to significant articles in physics is the AIP online service *Physics News Update*. *Physics News Update* and its writers, Phil Schewe and others play a valuable role in broadening interest in articles across all major physics journals, including PRL. Particularly useful is *Update's* service which provides email listing across journals of papers relevant to a selected physics sub-field.

D. Identify and recommend important PRL papers to the scientific community in articles written by distinguished scientists

- **Background**

  Whereas *PR Focus* helps to publicize *PRL* papers for non-specialists, and a *Popular Abstract* would continue this tradition, there is currently no regular vehicle for independent scientific experts to focus the attention of the physics community on papers in *PRL* which they regard as particularly important. This is especially important as the journal grows in size and becomes more difficult to browse online. In recent years, there has been an increasing tendency for people to publish their most dramatic (or at least their most newsworthy) papers in *Science* and *Nature*. Part of the popularity of competing journals such as *Nature* is due to their regular offering of sections such as "*News and Views*" which provides additional coverage of their articles. It is to be hoped that by similarly showcasing a limited number of *PRL* papers, *PRL* will become a more attractive vehicle for such "spectacular" articles.

- **Recommendation 9: The committee encourages the editors to create a new online feature of *reviews by distinguished scientists of noteworthy PRL papers***
  - As part of the effort to increase the broad appeal of *PRL*, and in particular to increase its actual usefulness in communicating particularly important results across the barriers between subdisciplines of physics, we propose experimenting with a new "*Perspectives*" or "*Highlights*" feature (the exact *name* to be determined by the Editors) which could be a section of *PRL*. Here, short articles

written by distinguished scientists would be published on a regular basis in order to provide a guidance to the community on the importance and implications of recently published noteworthy articles by other authors in *Physical Review Letters*.

- Unlike *Focus* articles, these articles would be written by experts in the particular area, but subject to intensive editing by the in-house editorial staff for accessibility and clarity. One likely source for authors for these papers would be from among the referees who accepted the paper, or a Divisional Associate Editor who may have dealt with the case. The Editors and Divisional Associate Editors will chose the papers deserving a *Perspectives* article, who will write it, and decide whether (once written) the resulting article warrants publication. The Editors and author of the *Perspectives* article are expected to interact with the author of the original *PR Letter* to assure that the interpretation is accurate. Aside from this there will be no refereeing of the *Perspectives* article.
- In addition to its primary purpose of identifying and making more broadly accessible important results, we see two potential collateral benefits of this new section. Firstly, if, as we hope, these articles will be widely read, being selected to write a *Perspectives* article may come to be viewed as somewhat of an *honor*. Secondly, by adding visibility to certain of the most exciting articles published in *PRL*, this may increase the attractiveness of *PRL* to authors for their most dramatic papers.
- Concerning the timing of the *Perspectives* article: It does *not* have to be published simultaneously with the associated PRL article (unlike the Popular Abstract). However, it should be written and published in a *short time thereafter*, in order for it to remain topical. Again, we propose leaving the details of how this is arranged to the Editors and Divisional Associate Editors.

E. Miscellaneous additional recommendations

- **<u>Recommendation 10</u>: The priority of other internet-posted manuscripts in relation to PRL articles should follow the custom and wishes of particular physics subdisciplines. A uniform policy is not recommended.**
  - Manuscripts are increasingly being posted to the internet without passing through any editorial process such as peer review. An example is high energy theory research posted to the archival preprint server arXiv. The impact of other internet-posted manuscripts on the acceptability of a manuscript submitted to *PRL* is viewed differently by the separate communities of evolving research.
  - Referees should be encouraged to be vigilant for submitted manuscripts that develop without attribution material contained in already-posted manuscripts. The editors should pass along to the author comments from the referees about missing references, including those posted on the internet, such as arXiv. Author objections to inclusion on the grounds of relevance or of the posted paper not being published should be handled in the editorial process. The response of referees and authors to internet-posted manuscripts will vary with the field, with

such postings having the most weight in those sub-fields where arXiv posting is now standard practice.

- **<u>Recommendation 11</u>: A new policy for *Physical Review Comments* should be adopted**
  - The committee does not believe that *Physical Review Comments* is working very well as a vehicle for further discussion about published Letters. In need of fixing is the current practice of extensive give-and-take between the authors of the *Comment*, the authors of the original paper (and *Response*), various referees, and the editors. This practice uses up too much editorial labor; it often leads to a long delay between publication of paper and the *Comment*; it produces *Comment*s and *Responses* which are too bland and too technical.
  - We recommend that a new policy for *Comment*s be adopted. The editors should consider abandoning the attempt to produce a matched pair of Comment and Response, in which each respective argument is rebutted or "prebutted." Much less effort should be made to ensure that any Response appears in the same number issue as the Comment. (An online forward link could always be supplied to a later Response)
  - The submitting author of the original paper should be asked to be one of three referees for the *Comment*. Publication would then require approval by two of the three referees. The author of the *Comment* can modify the *Comment* in response to the referee reports. Since it will be less likely that a *Response* will be published back-to-back with the *Comment*, the referees for *Comment*s should be instructed that they should only approve the publication of the *Comment* if it satisfies both of the following criteria in addition to current PRL requirements:
    - it treats the original paper fairly (e.g., the *Comment* must not attempt to gain rhetorical advantage by distorting the original paper's position.) and
    - it is likely to be interesting and useful to the readers of PRL.
  - The author of a *Comment* manuscript should have limited right of appeal if the *Comment* is rejected. With this approach, we anticipate that processing a *Comment* would be *less* editorial work than processing a regular manuscript. The publication of an accepted *Comment* should not be held up to await the submission and refereeing of a *Response*. Ultimately, of course, any Response that is finally published should appear at least as a forward link in the archival (electronic) form of the journal.
  - The committee recommends that Responses be treated as separate submissions: i.e., they be handled as *Comment*s themselves. Referees must decide if a "*Comment* on a *Comment*" meets the all-important criterion of being interesting to the PRL readers. Under the current policy, many Responses say, in effect, "*The authors of the Comment are technically correct, but we still think that our original paper is nice.*" Since this would not rise to the level of an interesting

Comment on a *Comment*, editors under the new policy would be empowered to summarily reject without review these sorts of responses.

- **<u>Recommendation 12</u>: The Editors should reconsider the division of Condensed Matter Physics contributions to PRL into the present two categories**
  - Divisions of a field as unified as condensed matter physics into subsections is arbitrary, and may even be harmful in its effect on research at the interface between subsections. It is a strongly held minority opinion that, for this reason, there should not be two subsections of Condensed Matter in PRL. Nonetheless, because the condensed matter section of PRL is so large, it was the majority opinion that there remains a need for such a division.
  - However, the present division appears to us to be archaic and confusing. As far as we know, PRL is the sole place in which condensed matter is divided according to "Structure etc." and "Electronic Properties etc." If a division is to be drawn, it seems to us more logical that it be a division that is recognized elsewhere, and that has something to do with how active scientists classify themselves. The two common divisions that are made in the community are between "hard" and "soft" condensed matter, and between "theory" and "experiment."
  - Adopting the soft and hard classifications has drawbacks:
    - There are many papers in PRL that do not fall clearly in one class or the other.
    - A non-systematic survey of recent issues of PRL suggests that, probably, the "hard" section would have many more papers than the "soft" section, leaving the problem of one overly large section unresolved.
    - PRL has now introduced new wording into one of its category headings: "Soft Matter, Biological and Interdisciplinary Physics." *It is not at all obvious to the committee that this is an appropriate grouping!*
  - The advantages of the theory and experiment classifications are that they would divide the section roughly in two (although probably the experimental section would still be significantly the larger) and, in most cases, the assignment of papers to one or the other section is unambiguous. It has the large disadvantage of placing in separate sections papers that deal with precisely the same physical issues.
  - Another Committee member suggests that the present two divisions in condensed matter are too coarse-grained and that more subcategories should be created, based, for example, on PRB sorting categories or March Meeting topics. Others are hesitant to recommend even more divisions than two, especially since the PACS numbers are designed for this purpose.

- The Committee does not have a clear preference to express in this report. The editors and the POC might wish to poll the condensed matter community on this issue and consider revising the descriptions of PRL categories for condensed Matter publications.