Physical Review: A family of journals serving the physics community.
The role of PRX

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Associate Editor
Physical Review X
The American Physical Society (APS)

Acknowledgment:
Ling Miao (PRX Managing Editor)
Serena Bradde (PRE editor)
Outline

- What do the Physical Review journals mean for physics?
- What is PRX?
- How does an editor see the editorial and peer-review process?
- How to publish papers in the Physical Review journals? (Tutorial)
What the Physical Review journals mean for physics
American Physical Society (APS)

- APS is a non-profit membership organization
- APS runs scientific meetings, supports physics education and educators, outreach, advocacy, international activities
- APS publishes the world's most widely read physics research journals
The *Physical Review* journals

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<tbody>
<tr>
<td>RMP</td>
<td>38</td>
<td>173</td>
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<tr>
<td>PRPER</td>
<td>55</td>
<td>182</td>
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<td>PRE</td>
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<tr>
<td>PRB</td>
<td></td>
<td>4,892</td>
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The APS Editorial Office

- **Editor in Chief:** Pierre Meystre
  Univ. of Arizona

- **In-house editors:** 45 (predominantly for PRL, PRX, PRB)
- **Remote editors** (mostly active researchers): ~70
  PRA, PRC, PRD, PRE, PR Fluids, and RMP
- **Technical supporting staff:** ~100

- **Research Areas**
  - Theoretical quantum optics
  - Atomic physics
  - Ultracold science
  - Optomechanics

Every 3 minutes
a new submission received
~ 37,300 (2015)
Global scientific publishing landscape

- 2,000 journal publishers globally
- 28,500 peer-reviewed journals
- 2,000,000 articles per year*
- 10m readers worldwide
- 2.5bn full text downloads per year

*Growing by 3-4% p.a.
The Physical Review family
Bedrock & go-to journals of physics

13% of physics articles (~18,000/yr)
25% of physics citations

Every 80 seconds
someone cites a PRL
Highly International Geographical Distributions Submissions and Publications From 110 Countries
Launched in May, 2011

Fully gold Open Access (APC: $2,900)

Flexible article lengths

How selective is PRX?

What kind of papers does PRX look for?
(Does it only publish “interdisciplinary” papers?)
PRX’s Selectivity

% of submissions rejected without external review in 2015

![Bar chart showing the percentage of submissions rejected without review, resubmitted, and published for different categories.](chart.png)
Selectivity increasing

NUMBER OF SUBMISSIONS AND ACCEPTANCE RATE

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of Submissions</th>
<th>Acceptance Rate (%)</th>
</tr>
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<tbody>
<tr>
<td>2011</td>
<td>282</td>
<td>22.3%</td>
</tr>
<tr>
<td>2012</td>
<td>326</td>
<td>24.5%</td>
</tr>
<tr>
<td>2013</td>
<td>722</td>
<td>23%</td>
</tr>
<tr>
<td>2014</td>
<td>1326</td>
<td>14.6%</td>
</tr>
<tr>
<td>2015</td>
<td>1676</td>
<td>11%</td>
</tr>
<tr>
<td>2016</td>
<td>1745</td>
<td>10%</td>
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Selectivity increasing
PRX’s Visibility & Impact

**Published & highlighted* articles**

* in scientific and popular press

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<td>38</td>
<td>70</td>
<td>94</td>
<td>216</td>
<td>174</td>
<td>198</td>
</tr>
</tbody>
</table>

*Articles published and highlighted in scientific and popular press.*
Scope:

- Established core areas of physics

- Cross-topic, cross-field within physics (optics/nonlinear dynamics, solid-state physics/AMO)

- Cross-disciplines: Research that employ concepts and techniques from physics to advance significantly other disciplines (chemistry, biology, computer science, …)

Types: Theoretical, experimental, computational
*Key* Papers: Create, Transform, Advance

Highest Scientific Quality, Broad and Lasting Impact

Make new fundamental discoveries
(e.g. prediction and verification of Weyl semimetals)

Create a new paradigm or paradigm shift by thinking and achieving the ‘impossible’
(e.g. imaging cortical-actin-based compartments of cell membranes)

Provide a fruitful analogy between fields
(e.g. statistical physics – computer science → machine learning, sensing)

Connect two previously isolated areas of physics in a nontrivial way
(e.g. polymer + epigenetics → DNA biophysics)

Push a field into a new direction
(e.g. non-equilibrium EoS for active matter)

Advance the state-of-the-art of a field
(e.g. new highly versatile density functional for materials)

Provide important and substantive follow-up to path-breaking papers
High-level Editorial Engagement in Editorial/Review Process:

- Essential reading of the manuscript in question
- Relevant literature search (WoS, Google Scholar/arXiv, APS DB)
- Collective discussions among the editors
- Consultation with the Editorial Board & other external experts
- Careful choices of pertinent referees
- Obtain clearly oriented and substantive reports
  - Specific questions to referees for their reviews
  - Follow-up queries about unclear/unsubstantiated reports
- Listen to authors’ substantive and meaningful arguments

PRX’s “5-Stars” Editorial Service

- Thoughtful, reasoned initial editorial rejection
- Well-informed, clear editorial decisions during the review process
Further Growth During the Next Few Years

✦ Increase quality
✦ Broaden topical coverage
✦ Increase impact and prestige

PRX’s Ultimate Position:
A society-run, open-access, small-size journal of the highest quality offering broad dissemination, visibility & special recognition to key or pivotal papers in physics research
Physical Review E (PRE)
Physical Review E
covering statistical, nonlinear, biological, and soft matter physics

Large and interdisciplinary
Wide distribution to a broad readership

Statistical & nonlinear physics, complex systems (44%)
Soft matter & biological physics (32%)
Fluids & plasma physics (16%)
Solids & computational physics (8%)

We are happy to have suitable papers transferred from our sister journals such as PRL and PRX. We have access to the full review history.
Annual submissions: ~4000
Annual published papers: ~2500
Rejections without external review: ~20%
Number of editors: 20
Authors, referees, readers, and editors are from the international community.
The Editorial/Review Process: An Editor’s View
Peer Review
(referees picked by editors*)

Acceptance
PRL ~ 23%
PRX ~ 10%

Rejection

Editorial Rejection
PRL ~ 33%
PRX ~ 65%
PRB ~ 37%

Resubmission

Appeal to Editorial Board

New Paper: Editorial Review

Editorial & Peer-review Process
At a Glance
Editor’s Role
Select and Promote Quality Research

- Help good papers get published as quickly as possible
- Filter out unsuitable papers by editorial rejection & peer review
- Add value to papers:
  - Improve papers via editorial & peer review
  - Add more visibility to the best papers
- Help (young) researchers become skilled authors & referees
For Editors: Red Flags for Editorial Rejection

- Marginal extension, incremental or modest advance
- Problem solved or issues addressed too specialized or of limited impact (in particular for PRX)
- Subject matter or readership does not fit
Unconvincing presentation:
- no compelling motivation:
  Why was the work done?
  What open and important problem does it solve?
- no punch line:
  What are the main message(s) or results?
  Why are they new & important?
  How will they impact or influence others’ research?
- too focused on technical details
Influential papers often controversial
Experts’ judgment not always faultless

Example:
In 50% cases of the top-20 cited papers in PRL (published in 1991-2000 in plasmonics, photonic crystals and negative refraction): editors received conflicting referee recommendations in the 1st round of review.
Challenges For Editors

- Influential papers often controversial
- Experts’ judgment not always faultless
- Editors’ own knowledge of field and people limited
- Editors’ time constraints: (10-15 cases handled daily/per editors)
- Highly selective journals are subjective by definition: the 41st chair effect
The 41st Chair effect:

In any highly selective process, it is impossible to select all and only the ‘best’ candidates.

The 41st Chair Effect

“The French Academy decided early that only a cohort of 40 could qualify as members and so emerge as immortals. This limitation of numbers made inevitable, of course, the exclusion through the centuries of many talented individuals who have won their own immortality. The familiar list of occupants of this 41st chair includes Descartes, Pascal, Moliere, Bayle, Rousseau, Saint-Simon, Diderot, Stendhal, Flaubert, Zola, and Proust.

What holds for the French Academy holds in varying degree for every other institution designed to identify and reward talent.”

Influential papers often controversial
Experts’ judgment not always faultless
Editors’ own knowledge of field and people limited
Editors’ time constraints (15 papers processed daily/editor)
Selective journals are subjective by definition: the 41st chair effect
Social, cultural factors affect behavior of authors & referees and can thereby affect the fate of papers
Responsive, conscientious referees overburdened
When a field or topical area is new or emerging:

Initial growth stage: supporting growth
Lots of new ideas and “low-hanging fruits”
- Proposals, theoretical papers
- Proof-of-principle experiments

As a field or topical area matures:

Slower growth stage: higher standards
- Solutions to harder problem
- More significant advances
Editorial/Peer-review Process
Is
Neither Exact Science, Nor Perfect

Solution: Professional Exchanges between Authors, Referees, Editors

- Inject as much as objectivity as possible
- Understand and accept reasoned subjective judgment
Your work starts before this step!

New Paper: Editorial Review

Peer Review (referees picked by editors*)

Acceptance
PRL ~ 23%
PRX ~ 10%

Rejection

Resubmission

Editorial Rejection
PRL ~ 33%
PRX ~ 65%
PRA ~ 27%

Appeal to Editorial Board
What To Do At Three Different Stages

- How to prepare a paper for submission
- What to do when submitting a paper
- How to communicate with editors and referees during the review process
Before Submission: How to Prepare

✦ Before you begin to write your paper: ask the following important question

Which journal is my work suitable for?

Scope, Standards, Article Type and Format

Scope:
✦ PRL, PRX: All areas of pure, applied, and interdisciplinary physics
✦ PRA – E, PR Applied, PR Fluids, PR Materials: Different subfields of physics
✦ Other journals
Acceptance standards:

- **PRA – E, PR Applied, PR Fluids, PR Materials:**
  New and significant physics
  Have impact on the relevant area(s) of specialization

- **PRL:** ~ 2500 papers per year
  Relatively comprehensive coverage of very important steps in the creation and development of a field

- **PRX:** 200 – 300 *key* papers per year
  Report the most important steps in the creation and development of a field

Divisions between the journals not clear cut or exact!!
Which Journal Is My Work Suitable For

Article Types and Format:

✦ PRA – E, PR Applied, PR Fluids, PR Materials:
  Regular Articles; no length limit
  Rapid Communications; 4 – 5 pages

✦ PRL: Letters; 4 – 5 pages

✦ PRX: Research Articles
  No length limit: short “Letter”-type;
  longer papers (with Appendices)
How to write a good paper

- What information and material to present?
  - Big picture:
    Relevant context, scientific problem you solved
  Main results: What they are;
    Why they are new and important
- Essential technical information:
  What readers will need in order to understand
  and reproduce your work
How to write a good paper

- How to organize the information and material?
  - Abstract
  - Introduction
  - Main body
  - Conclusion: Summary and Outlook
  - Appendices (PRX, PRA-E-Applied-Fluids-Materials)

Different parts, different emphasis
Balance big picture with technical material
Logical, smooth connections between the different parts
How To Make A Good Submission

- Read general information for authors:
  (e.g. for PRX: http://journals.aps.org/prx/authors)

- Select PhySH terms (& Subject Areas for PRX)

- For PRL, PRX and PRA Rapid Communications: Prepare a brief justification: Required!
How To Make A Good Submission

- Provide additional information to the editors:
  - Your own related papers submitted to other journals: provide copies as reference material
  - Tell editors about the scientific debate or controversy your work contributes to, or clears up
  - Suggest referees:
    Don’t just suggest famous researchers or big names. For young referees, provide a brief description of their concrete expertise
How To Communicate With Editors & Referees

Be Constructive and Focus on Making Progress When Resubmitting Your Paper

✧ Point-to-point letter of response to ALL referee comments:
  ‣ When agree with the referees’ criticisms:
    provide a response, revise the paper, describe significant changes
  ‣ When disagree with the referees’ criticisms:
    take responsibility for misunderstanding whenever possible;
    provide your counterarguments calmly
How To Communicate With Editors & referees

✦ A revised manuscript &
an explicit list of major changes made

✦ (Confidential) information for the editors:
  » Some of the referees completely missed
    the point of your work: Explain why
  » Some of the referees may hold too strongly one point
    of view in a scientific controversy
  » Update on recent (published or unpublished)
    related papers
Your feedback & suggestions
Your view of the Physical Review family?

How should we improve our journals?

How do you and your institute judge a journal and a researcher?

How should you and your institute judge a journal and a researcher?

Thank You!
How To Write A Good Paper

Abstract

- Be clear, brief
- Explain the scientific problem you solved
- Present the main new results, Expt. or Th.
- Describe their importance, implications
How To Write A Good Paper

Introduction

- Explain your research problem and goal(s):
  - scientific context (background and history) and motivation
  - objective, adequate referencing to the existing literature
- Present the main results:
  - What the results are
  - Your qualitative understanding of the physics
  - Why new and why important?
  - Why broad – influence many people’s research?
- Concise, informative, avoid jargon
How To Write A Good Paper

Main Body

- Necessary technical information:
  - technical definition of the problem or experiment
  - how the theoretical problem is solved or how the experiment is executed;
  - not every detail, but self-contained:
    allow other researchers to reproduce your work!

- Logical, substantive presentation and discussion of the results and the underlying physics
How To Write A Good Paper

Summary and Conclusion

- Summarize the main results and their physical meaning
- Discuss their implications for current and future research;
- Present a meaningful scientific outlook

Don’t Exaggerate or “Hype”!
How To Write A Good Paper

✦ Style and Language:
  ‣ Language: simple, direct, and meaningful;
  ‣ English: ask others for help if needed
    (The editors don’t have the time to do this: Sorry!)
  ‣ Spelling check and careful proof reading

✦ Technical Editing:
  ‣ Figure check: clarity: Don’t put too much information necessary technical information
    (parameter values, legends, etc.)
## How Do Editors Select Referees

We look for referees in:
- **references** (authors of, referees of)
- **related papers** in Web of Science, SPIN, NASA, Google, APS database (authors, citing papers)
- **suggested referees**
- **referee expertise** in APS database
- editor’s **mental database**

We generally avoid:
- **Coauthors** (current or recent)
- Referees **at same institution** as authors
- **Acknowledged** persons
- Direct **competitors** (if known)
- **Busy** referees (currently reviewing for PR/PRL)
- **Overburdened** referees (> 15 mss/past year)
- **Consistently slow** referees (>8 weeks to review)
- Referees who **consistently provide poor reports**
Publications’ visibility & impact: Impact factor as measure of success
Make Our Best Papers More Visible

• Editors’ Suggestions: PRL, PRA-E, PR Applied

• Highlighting in *Physics*

• Recommending in *APS Tip Sheet* to popular media
“My question is: Are we making an impact?”
For journals: Impact Factor (??)

\[
IF_{2010} = \frac{\sum_{1}^{N} c(n)}{\frac{\text{citations}_{2010}}{\text{papers}_{2008-9}}} = \frac{\sum_{1}^{N} c(n)}{N}
\]

- 2-year time window
- average over the whole journal
- denominator effect
“Is PRL too large to have an ‘impact’?”, Antonoyiannakis & Mitra, PRL 102, 060001 (2009)
Large Journals Can Not Have High Impact Factors

2011 Impact Factor

PRL + RMP together!
IF 7.3 → 7.8

Papers published annually
Citations Depend On Topics & Stage of Development

PRL Is Many Journals In One

<table>
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<tr>
<th>Letters published 01Jan10 – 31Dec11</th>
<th>2012 IF</th>
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<td>topological insulators</td>
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<tr>
<td>graphene</td>
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<td>Ed. Suggestion</td>
<td>520</td>
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<tr>
<td>PRL</td>
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Judging A Journal by Its Impact Factor Only Is Too Simplistic and Flawed
The Physical Review Family:
The premier collection of physics journals
> 100 years expertise & reputation
12 research journals in total currently
~ 17,618 papers in 2015

1893
1913 APS takes over Physical Review
1929 RMP
1958 PRL
1970 PR splits into ABCD
1993 PRE
1998 PRST-AB
2005 PRST-PER
2008 Physics
2011 PRX
2014 PR Applied
2011 PRX
3317
2885
2568
3762
4918
1146
1146
1146
1146
APS physics