Physical Review Applied:

Finding its place in a 125-year-old family of journals

Julie Kim-Zajonz

Managing Editor, *Physical Review Applied*

Brazil, Oct. 2018

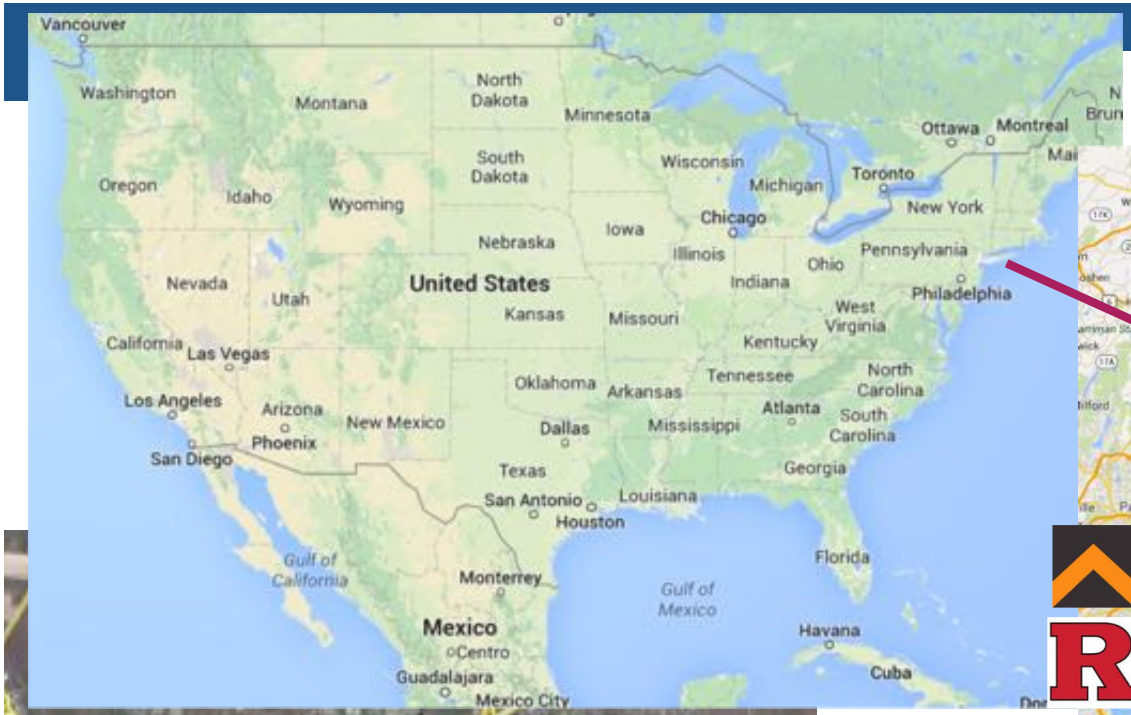
PHYSICAL REVIEW JOURNALS 125 YEARS

APS physics

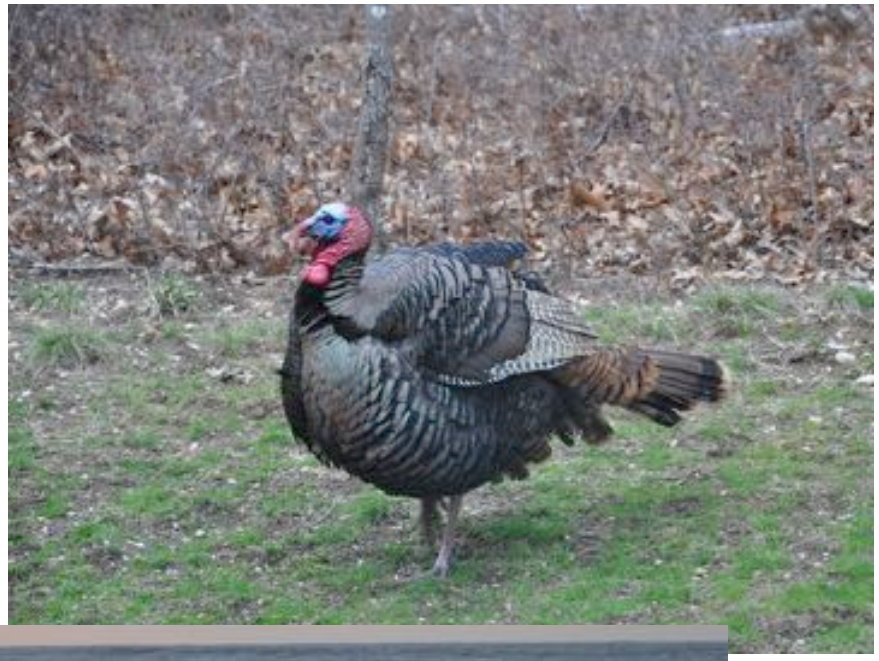
Outline

- The *Physical Review* Journals
  - Where we are
  - Who we are
  - What we do
- *Physical Review Applied*
  - Who we are (where we fit into this family of journals)
  - What we want
  - Where we are going

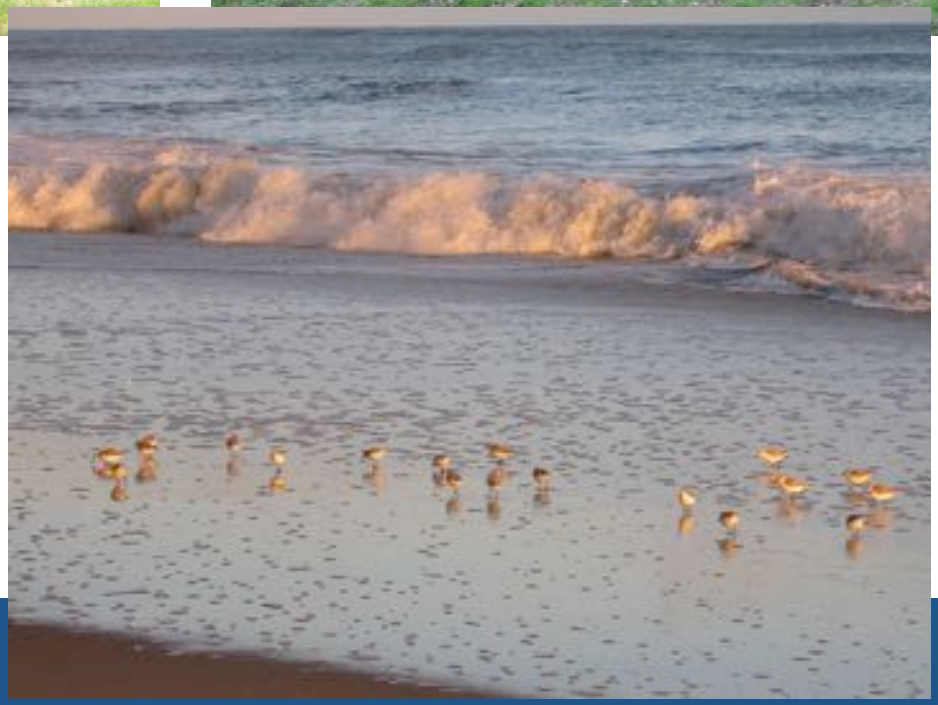
Where we are



PHYSICAL REVIEW JOURNALS 125 YEARS



It certainly is not
New York City!



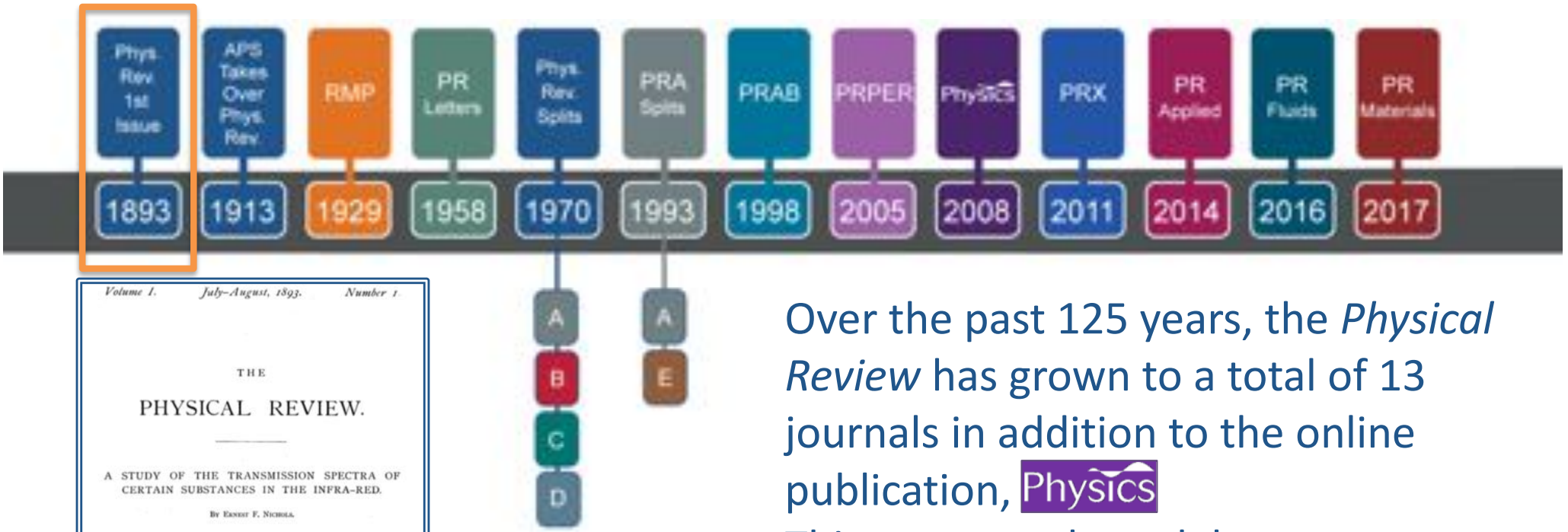

My office

Who we are


by-physicists
International
Scholarly
Community
Representative
Comprehensive
Not-for-profit
for-physicists

125th Anniversary

PHYSICAL REVIEW JOURNALS



Volume I. *July–August, 1893.* *Number 1.*

THE

PHYSICAL REVIEW.

A STUDY OF THE TRANSMISSION SPECTRA OF CERTAIN SUBSTANCES IN THE INFRA-RED.

By Ernest F. Nichols.

WITHIN a few years the study of obscure radiation has been greatly advanced by systematic inquiry into the laws of dispersion of the infra-red rays by Langley,[1] Rubens,[2] Rubens and Snow,[3] and others. Along with this advancement has come the more extended study of absorption in this region. The absorption of atmospheric gases has been studied by Langley[1] and by Ångstrom.[4] Ångstrom[5] has made a study of the absorption of certain vapors in relation to the absorption of the same substances in the liquid state, and the absorption of a number of liquids and solids has been investigated by Rubens.[6]

In the present investigation, the object of which was to extend this line of research, the substances studied were: plate glass, hard rubber, quartz, lamp-black, cobalt glass, alcohol, chlorophyll, water, oxyhæmoglobin, potassium alum, ammonium alum, and ammonium-iron alum.

[1] Report on Mt. Whitney Expedition, Profess. Papers, U. S. Signal Service, XV.
[2] Annalen der Physik und Chemie, N. F. XLV., p. 238.
[3] Annalen der Physik und Chemie, N. F. XLVI., p. 529.
[4] Bihang till K. Svenska Vet.-Akad. Handlingar, Band 15, Afd. 1, No. 9.
[5] Öfversigt af Kongl. Vetenskaps-Academiens Forhandlingar, 1890, No. 7, Stockholm.
[6] Annalen der Physik und Chemie, N. F. XLV., p. 258.

1

Over the past 125 years, the *Physical Review* has grown to a total of 13 journals in addition to the online publication, Physics

This year, we also celebrate:

60th Anniversary PRL

25th Anniversary PRE

20th Anniversary PRAB

10th Anniversary Physics

PHYSICAL REVIEW JOURNALS 125 YEARS

APS physics

The journals and what they cover

Phys. Rev. Lett. **(all of physics)**

Phys. Rev. X **(all of physics) – Open Access**

Rev. Mod. Phys. **(all of physics)**

Phys. Rev. A **(atomic, molecular, optical physics & quantum information)**

Phys. Rev. B **(condensed matter & material physics)**

Phys. Rev. C **(nuclear physics)**

Phys. Rev. D **(particle,fields, gravitation &cosmology)**

Phys. Rev. E **(statistical, nonlinear dynamics, biological & soft matter physics)**

Phys. Rev. Applied

Phys. Rev. Fluids

Phys. Rev. Materials **- NEW!**

Phys. Rev. Accelerators and Beams **– Open Access**

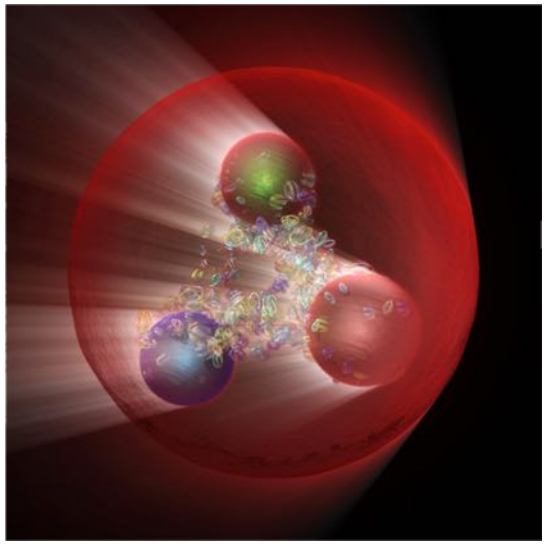
Phys. Rev. Physics Education Research **– Open Access**

Physics

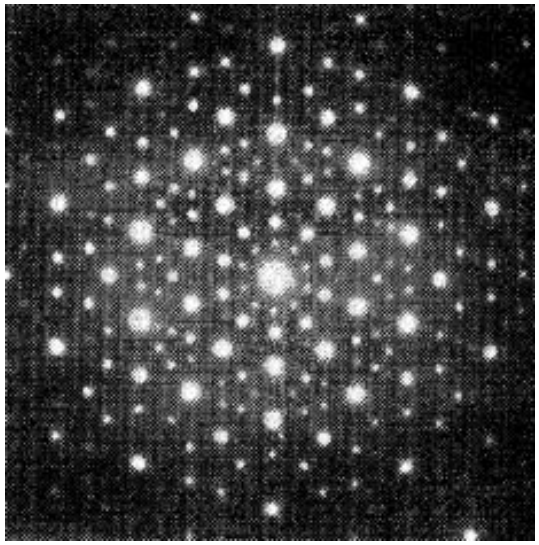
125th Anniversary

TIMELINE

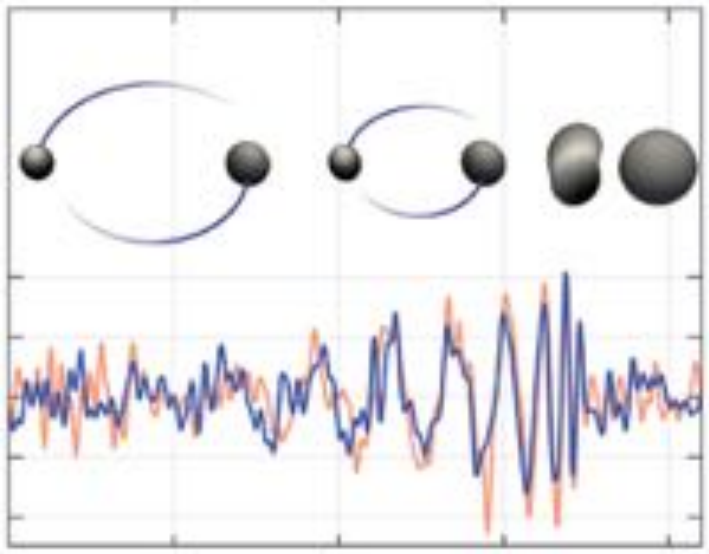
The editors selected papers and events that are of significance to physics and to the history of the APS. This was put together in a timeline.



1969
Experiments probe proton's structure



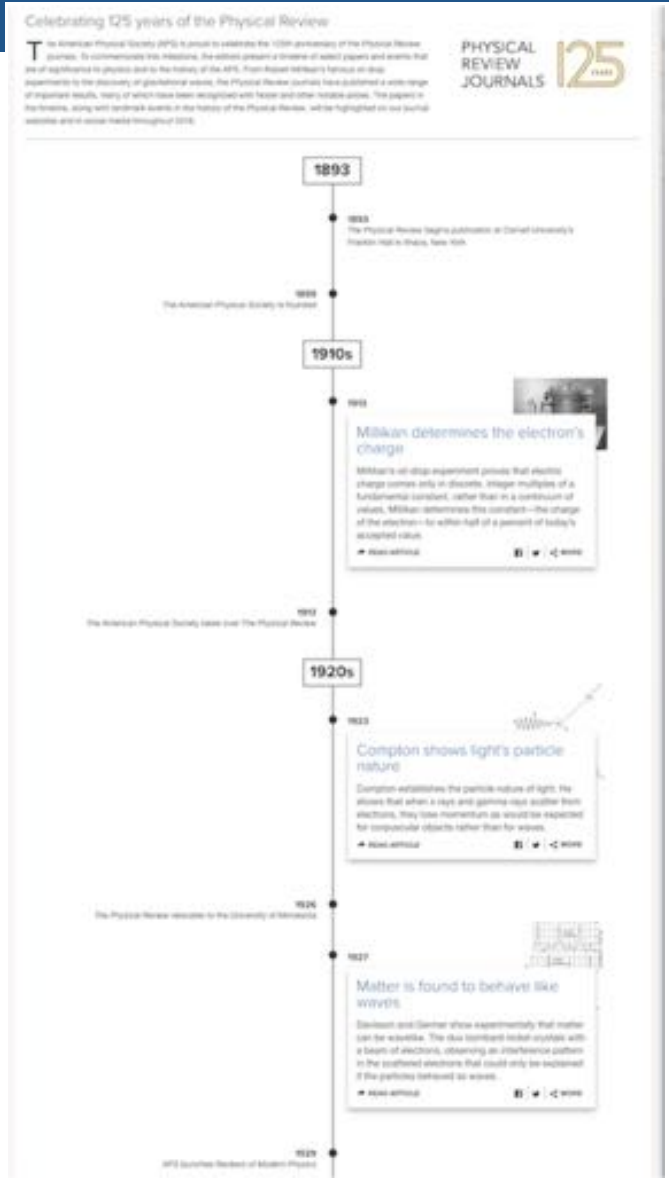
1984
Quasicrystals discovered

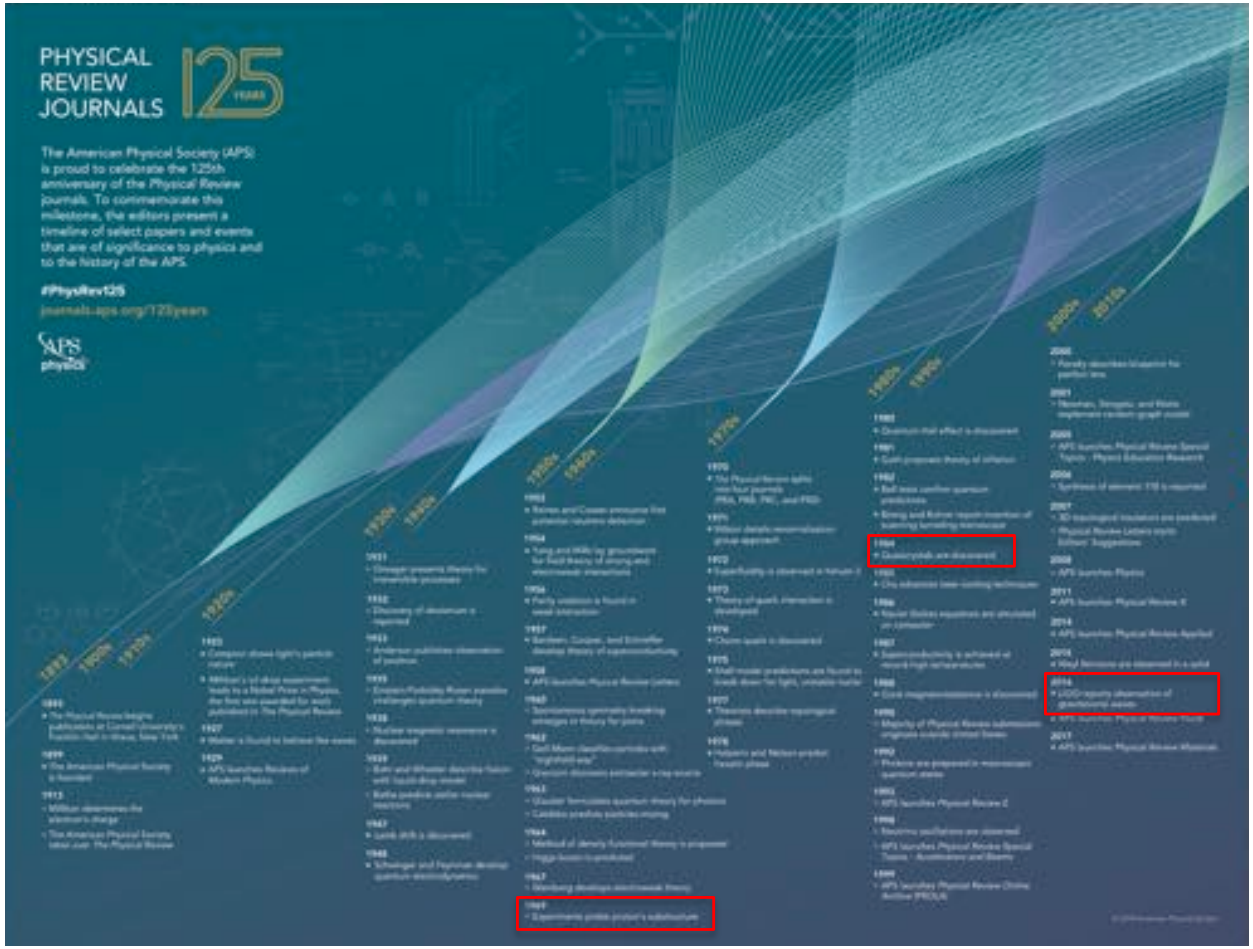


2016
LIGO reports observation of gravitational waves

125th Anniversary

TIMELINE





Website: journals.aps.org/125years Twitter: #PhysRev125

PHYSICAL REVIEW JOURNALS 125 YEARS

APS physics

The Editorial Office

Editor in Chief:
Michael
Thoennessen

Research area:
Nuclear Physics

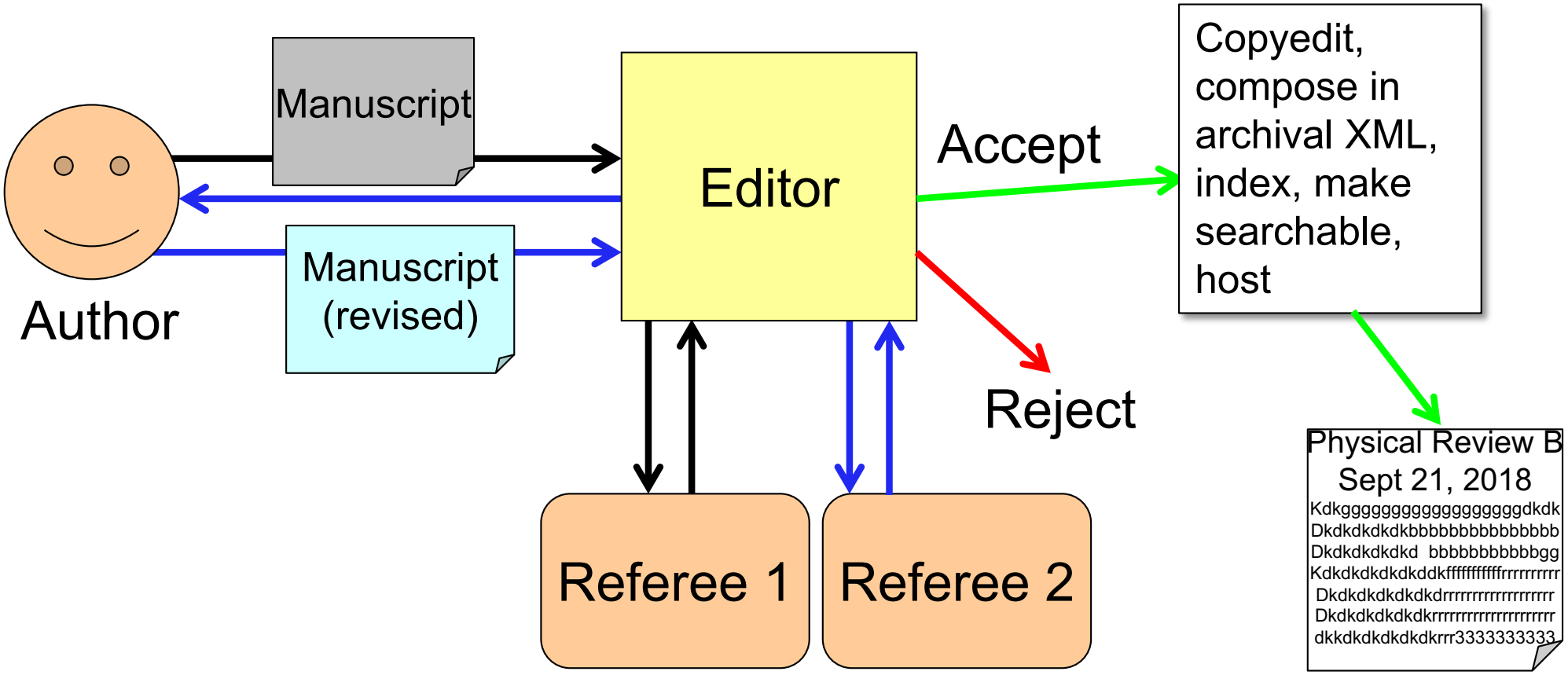
Michigan State
University,
Lansing

- In-house editors: ~ 50 (mostly PRL, PRB, PRX, PRApplied, PRMaterials
- Remote editors (mostly active researchers): ~ 80 (PRA, PRC, PRD, PRE, PRFluids and RMP)
- Support and technical staff: ~ 90

The editors at the *Physical Review* are international
130 Editors: 34 different nations

What we do

We manage the peer review and publication process



A small detour…

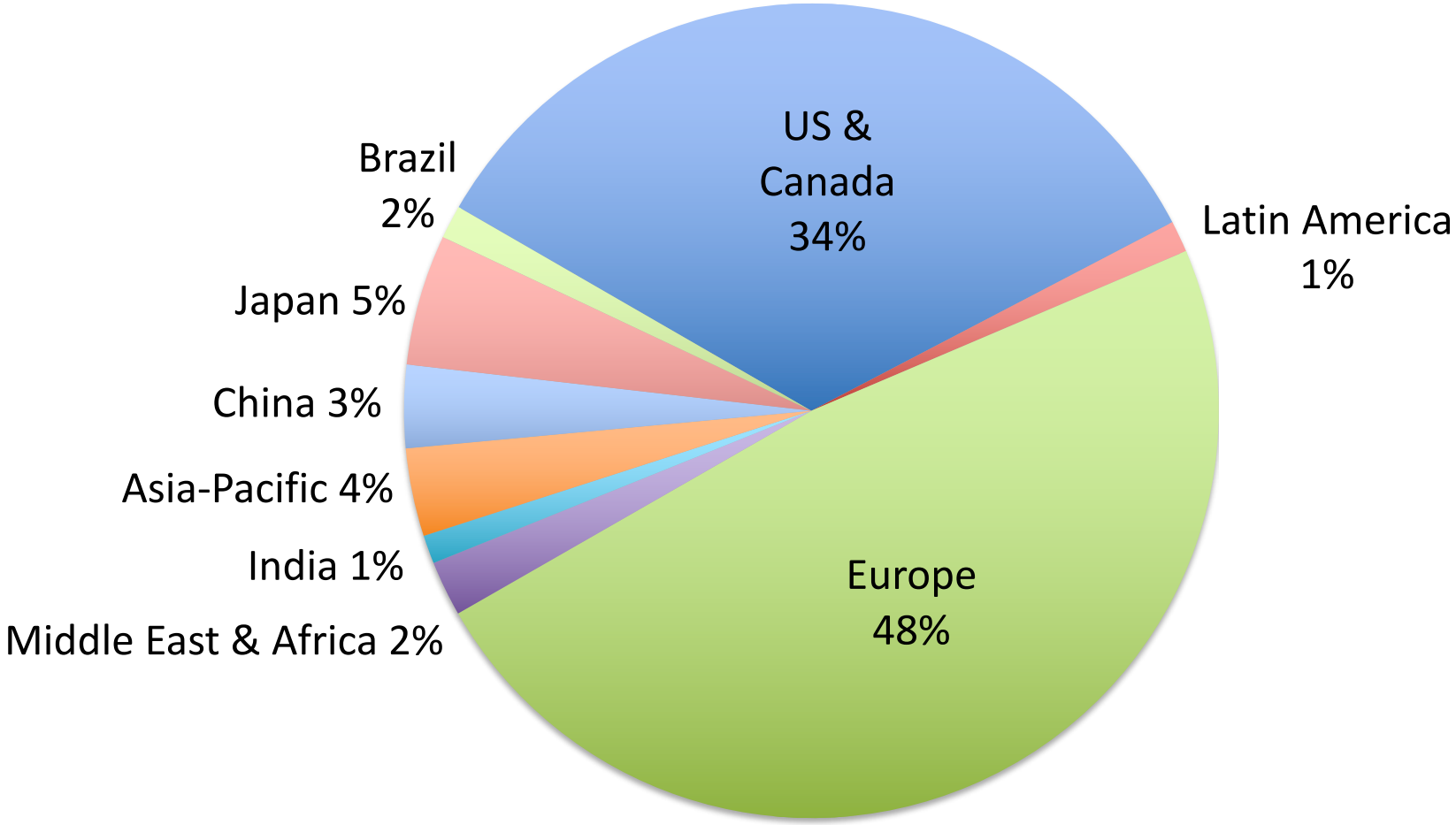
Our referees

Thank you for your help and support

Our referees are crucial to our journals, as is the quality of the reports.

- We have almost 70 000 active referees in database. Over 29 000 were sent at least 1 referral last year.
- We are, at times, adding hundreds new referees/month

Physical Review journals referees used 2017



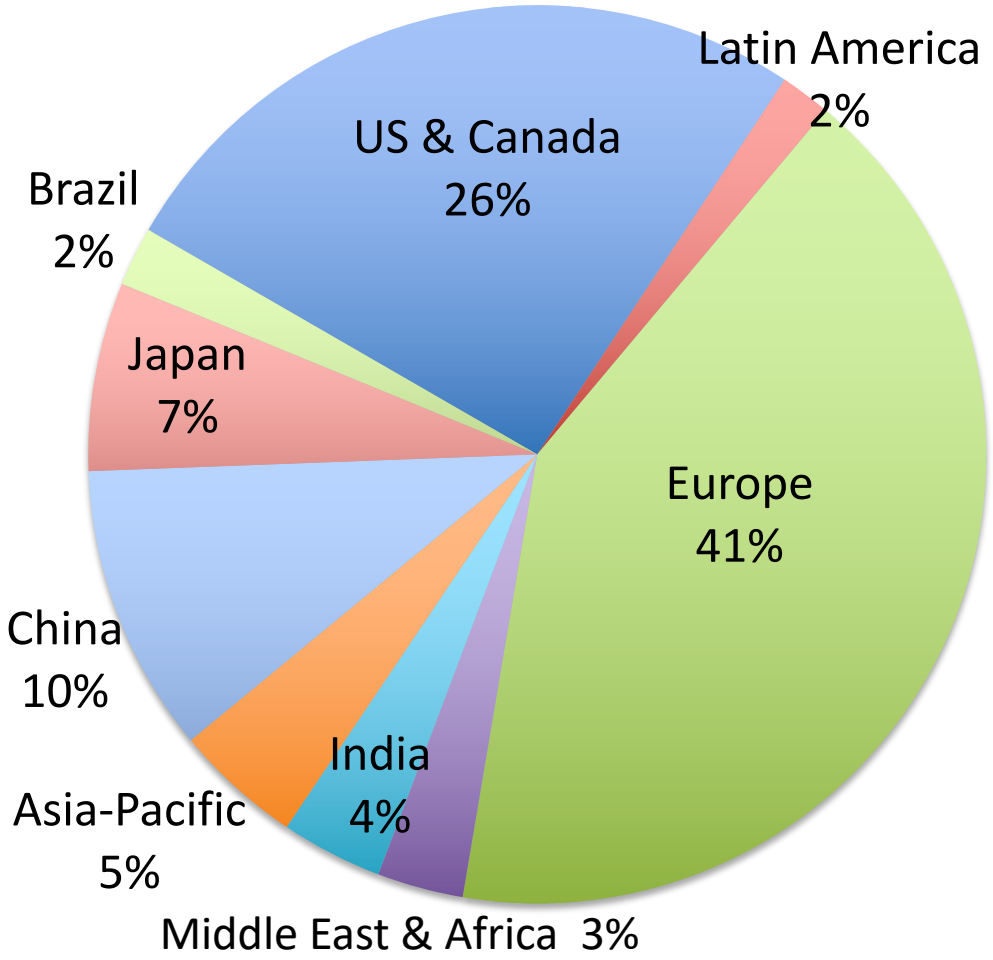
Outstanding Referees from Brazil

2008	George Emanuel Matsas	Universidade Estadual Paulista
2008	Amir O. Caldeira	Universidade Estadual de Campinas
2009	Sergio Machando Rezende	Universidade Estadual de Pernambuco
2011	Luis Raul Abramo	Universidade de Sao Paulo
2012	Luiz Davidovich	Universidade Federal do Rio de Janeiro
2012	Klaus Capelle	Universidade Federal do ABC
2014	Luiz Roberto Evangelista	Universidade Estadual de Maringá
2015	Dmitri Vassilevich	Universidade Federal do ABC
2016	Luis Craco	Universidade Federal de Mato Grosso - UFMT
2017	Ilya Lvovich Shapiro	Universidade Federal de Juiz de Fora
2017	Antonio Azevedo	Universidade Federal de Pernambuco
2017	Yan Levin	Universidade Federal do Rio Grande do Sul
2017	J. Carlos Egues	Universidade de Sao Paulo

Back to what we do…

Geographical distribution of papers published *Physical Review* journals

January 1 – December 31, 2017

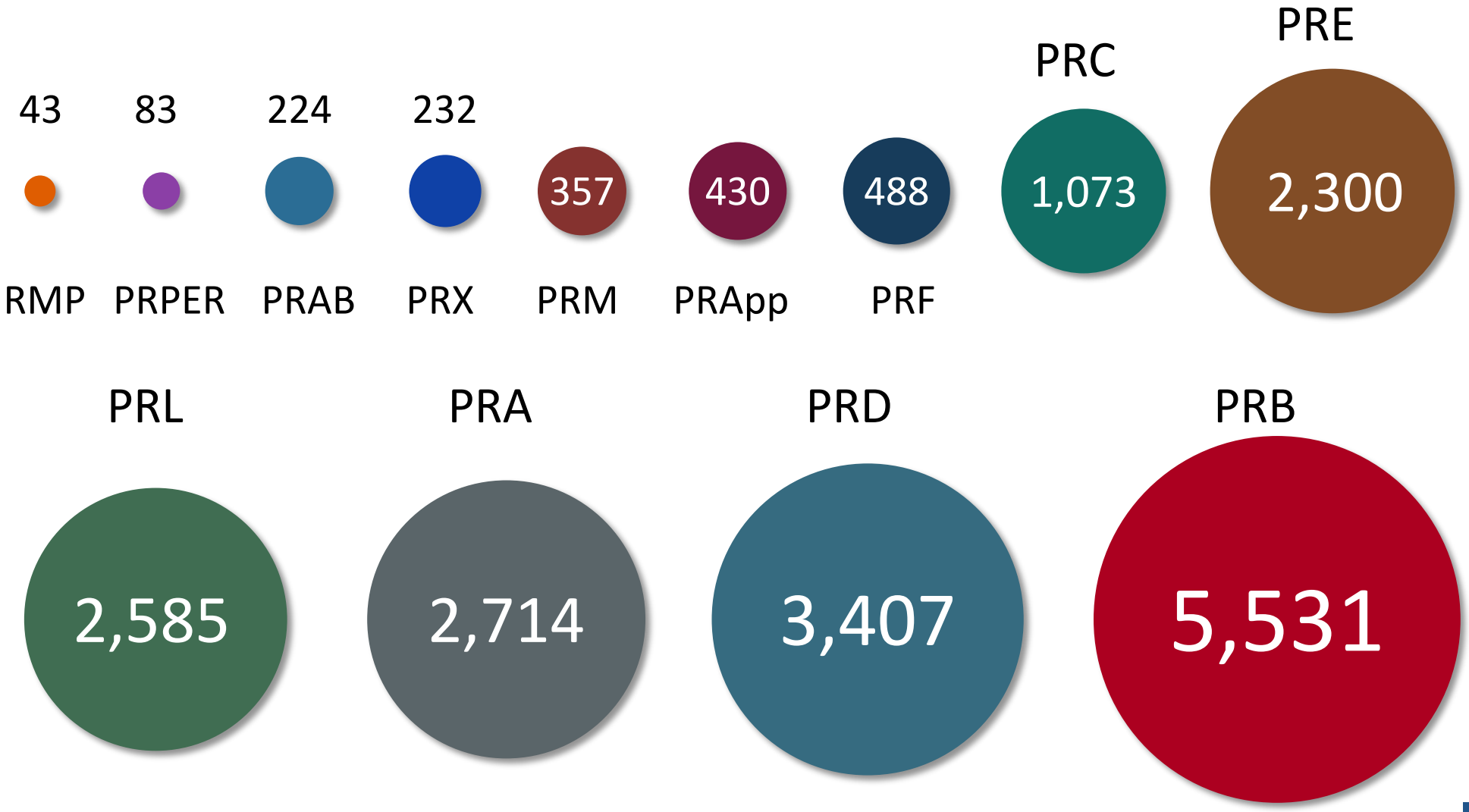


The *Physical Review* journals are on track to receive over 40,000 papers in 2018. Of those over 20,000 will be published.

Every 3 minutes
a new submission received

The *Physical Review* journals

Relative size, published papers (2017)



Articles published in *Physical Review* journals in 2017

5,531

Largest: PRB

38

Smallest: RMP

36.917

Highest IF (RMP)

3

Gold Open Access journals

5.1%

Of PR papers are published gold Open Access

PHYSICAL REVIEW JOURNALS 125 YEARS

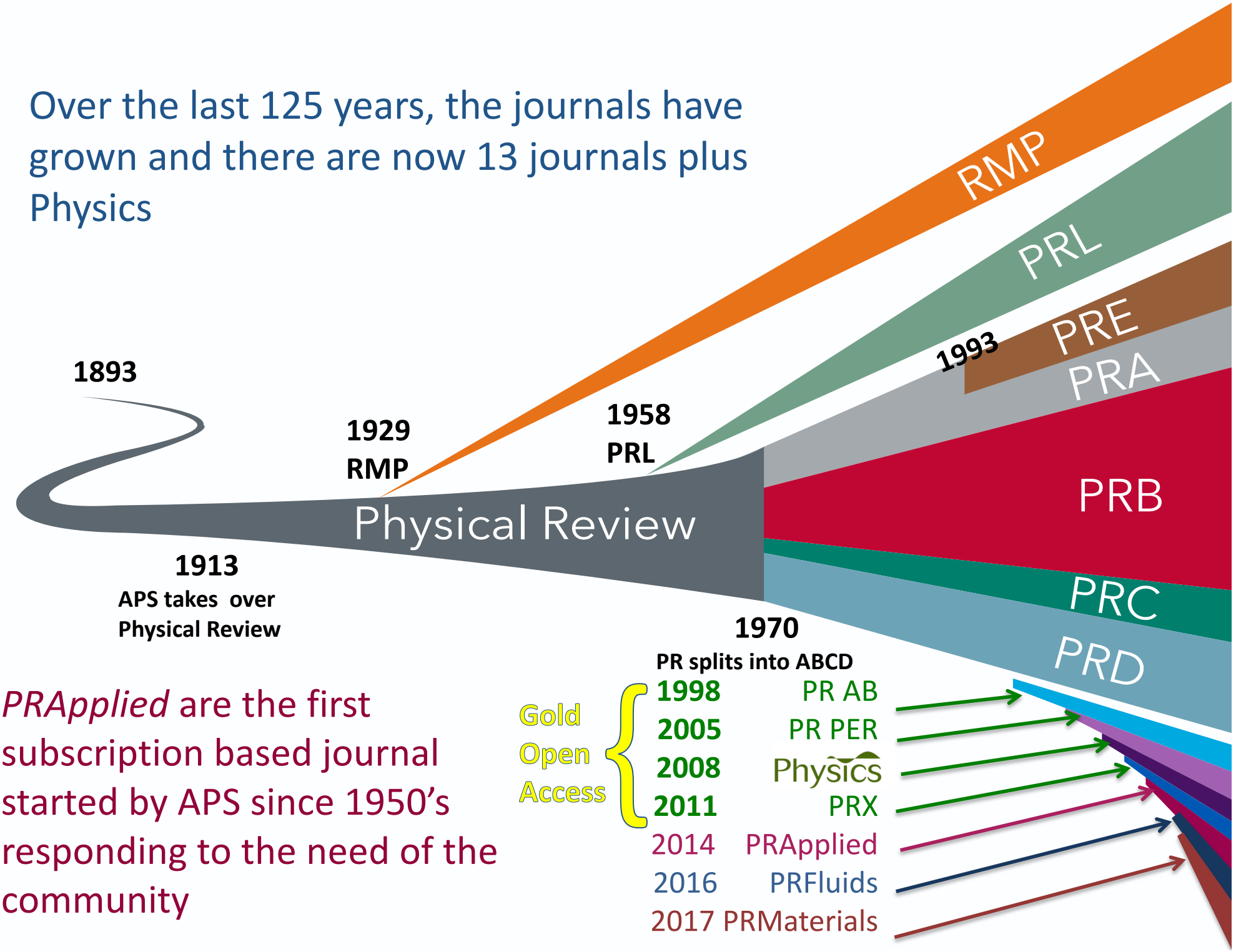
APS physics

Physical Review Applied

Dedicated to bridging physics, engineering, industry, and other disciplines

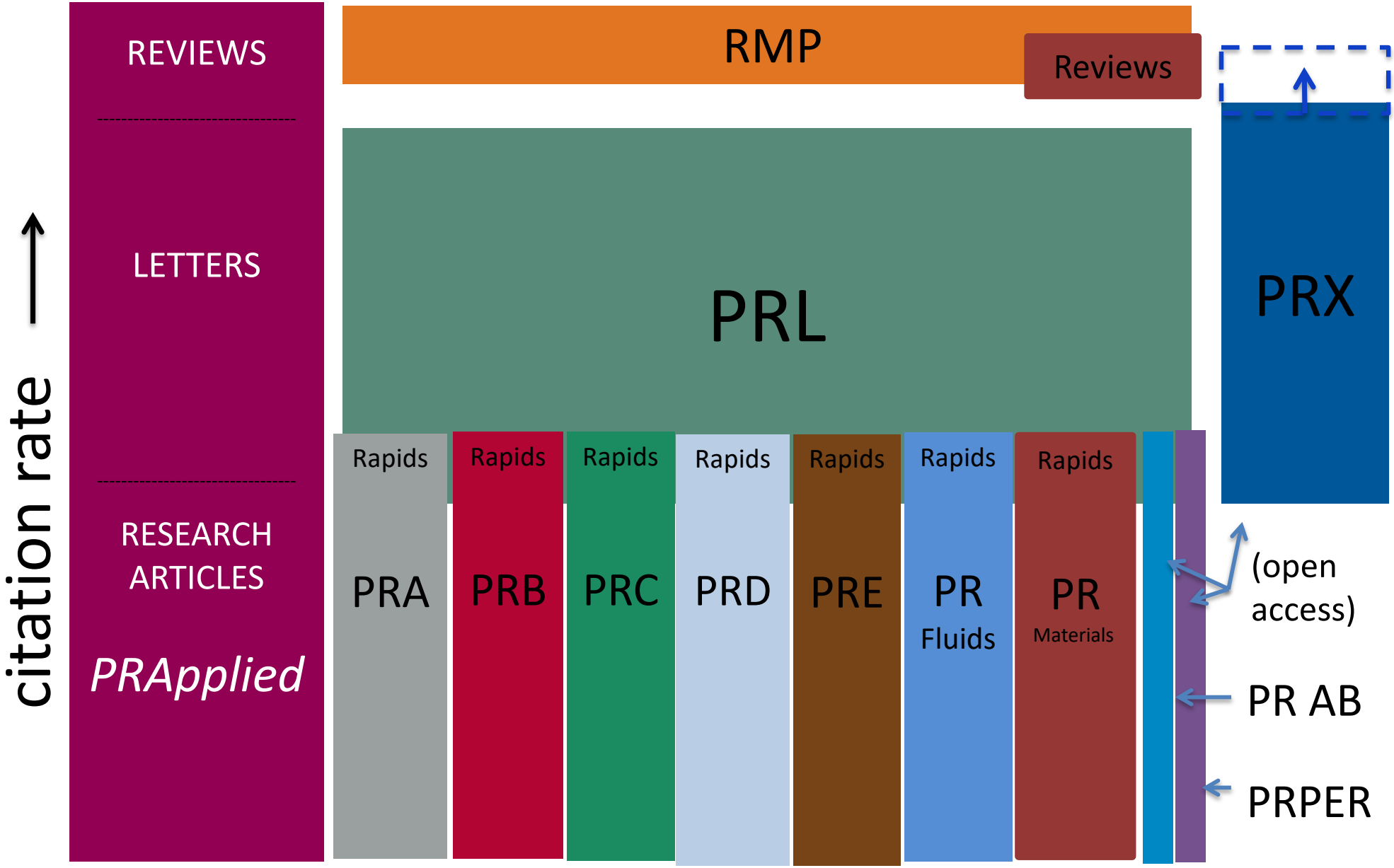
Goal: Publish high-quality papers in applied physics, using a constructive, thorough, and speedy review process

Over the last 125 years, the journals have grown and there are now 13 journals plus Physics



PRApplied are the first subscription based journal started by APS since 1950's responding to the need of the community

How does *PRApplied* fit into the family of journals?



Staff

Stephen Forrest, Lead Editor

Julie Kim-Zajonz, Managing Editor

Matthew Eager, Associate Editor

We currently have 23 Editorial Board Members in various subject areas (e.g. condensed matter physics, optics, soft matter and biological physics), but are in the process of adding more.

We also have a number of helpers from other journals notably, Juan-José Liétor-Santos from PRE and Paul Snijders from PRB.

What we want

Publication criteria for all the *Physical Review* journals

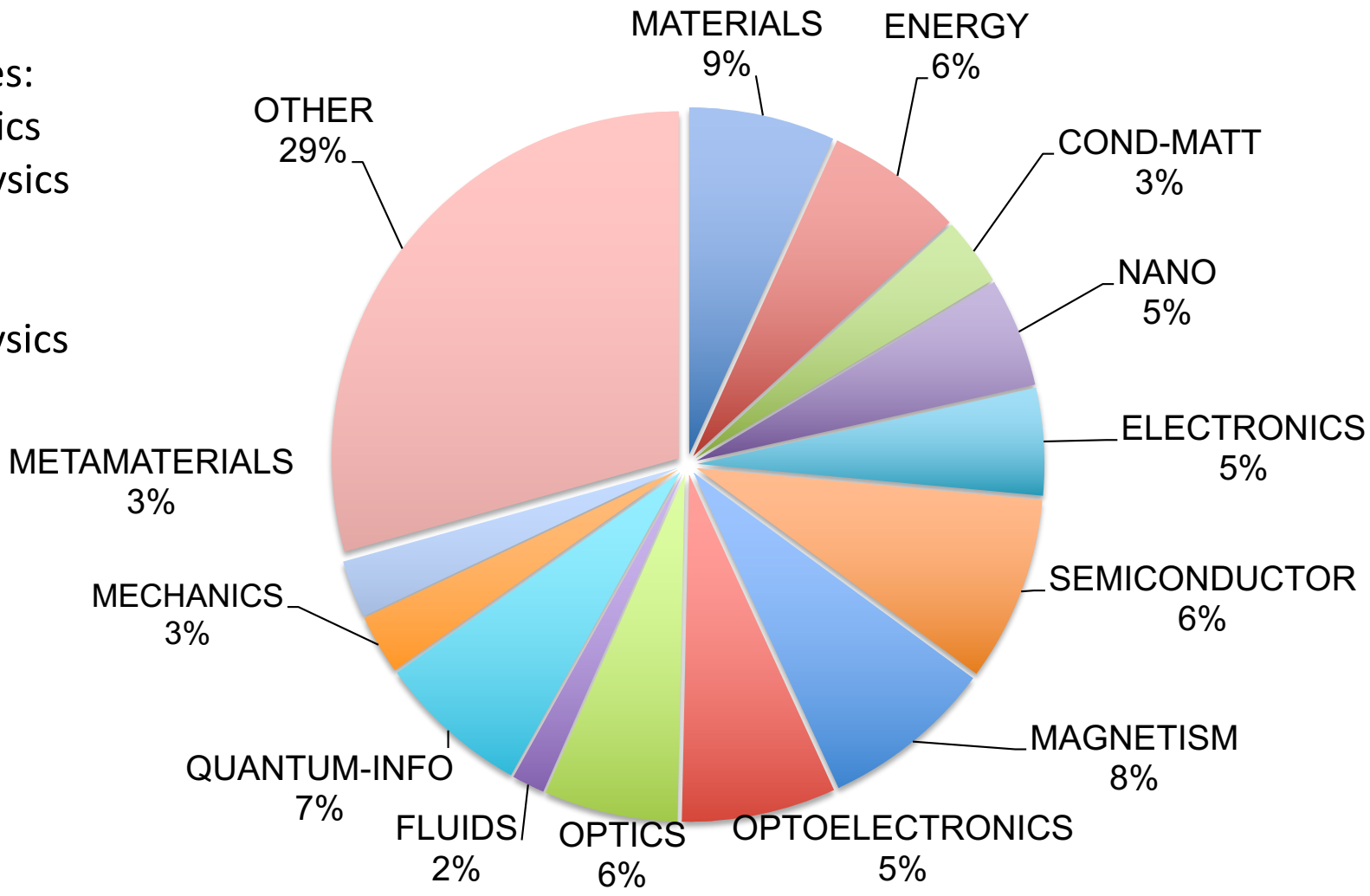
It is the policy of the American Physical Society that the *Physical Review* accept for publication those manuscripts that *significantly advance physics and have been found to be scientifically sound, important to the field, and in satisfactory form.*

Additional criteria that makes a successful PRApplied submission

- Fresh insight from or about physics
- Clear ties to concrete applications
- Significant and forward-looking
- Interesting to a variety of readers

Types of papers published in 2017

Other includes:
Medical physics
Biological physics
Photonics
Soft matter
Quantum physics



Physical Review Applied
journals.aps.org/prapplied

PRApplied published papers from Brazil

Published	Raw hits	Norm hits	Author	Title
Ap 3 044005	43	37	Dutt,A -- CRNL; INTELOR; U-SAO	On-chip optical squeezing
Ap 6 024015	6	9	de Araujo,C -- UFV-BR; CNRS-G; CEA-FR; UGREN-FR	Multilevel thermally assisted magnetoresistive random-access memory based on exchange-biased vortex configurations
Ap 6 024025	5	7	Leao-Neto,J -- UFA-BR; UFALAR-BR	Core-shell particles that are unresponsive to acoustic radiation force
Ap 8 024013	2	6	Lopes,J -- UFA-BR; U-SAO; UFALAR-BR	Focusing acoustic beams with a ball-shaped lens beyond the diffraction limit

Where is *PRApplied* now?

- 2017 Impact Factor: 4.782
- Number of papers published in 2017: 418
- Number of papers published so far in 2018 : 419 (projected 600)
- Number of Editors' Suggestion: 39 (9%)

Some “features” of *PRApplied*

- Since we are dealing with all of physics, every paper is accompanied by a “teaser” and key image
- Every paper is considered for highlighting as an Editors’ Suggestion
- Every paper is also considered by the Editors of *Physics*

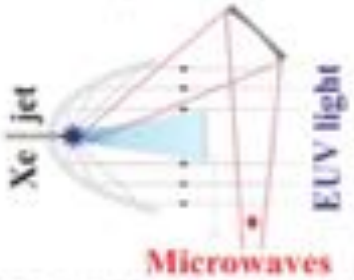
PHYSICAL REVIEW APPLIED

Recent Articles

Extreme-Ultraviolet Light Source for Lithography Based on an Expanding Jet of Dense Xenon Plasma Supported by Microwaves

I. S. Abramov, E. D. Gospodchikov, and A. G. Shalashov

Phys. Rev. Applied **10**, 034065 (2018) – Published 27 September 2018



High-resolution lithography for microelectronics demands a powerful, reliable source of light in the extreme-ultraviolet (EUV) range. Today's sources based on laser-produced plasma already operate near the technological limit, and will be unable to yield the output power needed for tomorrow's chip production. Thus the authors consider a source based on emission from multiply charged Xe ions, formed and supported in a freely expanding plasma jet by microwave light from a high-power gyrotron. Modeling indicates EUV conversion efficiency potentially exceeding that of a standard device, yet with a simpler overall design, safe operation, and the possibility of continuous-wave operation.

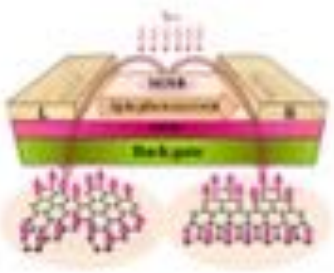
Show Abstract

Nanophysics | Optics | Plasma Physics

PDF | HTML

Every paper is considered for highlighting as an Editors' Suggestion in almost all the *Physical Review* journals

PHYSICAL REVIEW APPLIED



EDITORS' SUGGESTION

Graphene Nanoribbon Spin-Photodetector

Generating highly spin-polarized current is one of the main quests in spintronics. The authors design and theoretically benchmark a spin-photovoltaic device based on the intrinsic edge magnetism of a graphene nanoribbon, which creates a spin-polarized current when light is absorbed. The spin photocurrent can be suitably engineered by changing the gate voltage and scale parameters, and in principle a fully polarized current can be attained. This work shows the way to improved design and fabrication of hybrid optoelectronic-spintronic devices.

Sara Zamani and Rouhollah Farghadan
Phys. Rev. Applied **10**, 034059 (2018)

Current Issue
Vol. 10, Iss. 3 — September 2018
View Current Issue

Previous Issues
Vol. 10, Iss. 2 — August 2018
Vol. 10, Iss. 1 — July 2018
Vol. 9, Iss. 6 — June 2018
Vol. 9, Iss. 5 — May 2018
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PHYSICAL REVIEW APPLIED **10,** 034059 (2018)

Editors' Suggestion

Graphene Nanoribbon Spin-Photodetector

Sara Zamani and Rouhollah Farghadan*

Department of Physics, University of Kashan, Kashan 87317-51153, Iran

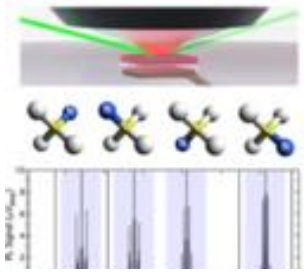
(Received 14 February 2018; revised manuscript received 18 May 2018; published 26 September 2018)

We introduce a concept to generate spin-polarized currents in graphene nanoribbons by using light radiation and a significant electron-electron interaction. For this purpose, we design a phototransistor based on the sawtoothlike graphene nanoribbons (SGNRs). The structures, with their intrinsic magnetic moments, have a narrow spin-dependent band around their Fermi energy that can enhance interband transitions and produce a spin photocurrent at room temperature without applying any magnetic field and without using any element. Interestingly, the changes in the size parameters and the gate voltage modify the magnitude and position of optical absorption peaks and optical spin polarization and the gate voltage individually switches the sign of the spin photocurrent. Finally, the fully spin-polarized photocurrent, the high quantum efficiency with a maximum of approximately 40%, the wide-wavelength-range operation from ultraviolet to infrared and optical spin-filtering effects, that are tunable with size and gate voltage, pave the way toward the improved design and performance of spin-optoelectronic devices based only on carbon atoms.

DOI: 10.1103/PhysRevApplied.10.034059

Every paper published in any *Physical Review* journal is also considered by the Editors of *Physics* for highlighting as a Viewpoint, Synopsis, or Focus

Some papers highlighted in Physics (Synopsis and Focus) in 2018:



Featured in Physics | Editors' Suggestion

Simultaneous Broadband Vector Magnetometry Using Solid-State Spins

Jennifer M. Schloss, John F. Barry, Matthew J. Turner, and Ronald L. Walsworth
Phys. Rev. Applied **10**, 034044 (2018) – Published 21 September 2018

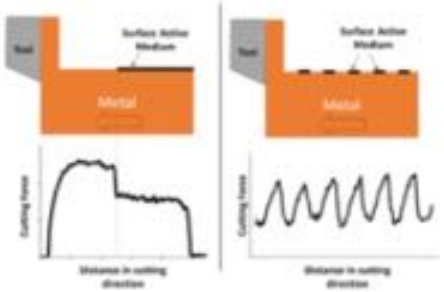
Physics Synopsis: A Faster Diamond Magnetometer

Featured in Physics

Material-Independent Mechanochemical Effect in the Deformation of Highly Strain-Hardening Metals

Anirudh Udupa, Koushik Viswanathan, Mojib Saei, James B. Mann, and Srinivasan Chandrasekar
Phys. Rev. Applied **10**, 014009 (2018) – Published 13 July 2018

Physics Focus: Glue or Ink Improves Soft Metal Cuts

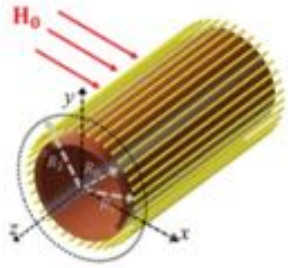


Featured in Physics

Static Magnetic Cloak without a Superconductor

Wei Jiang, Yungui Ma, and Sailing He
Phys. Rev. Applied **9**, 054041 (2018) – Published 29 May 2018

Physics Synopsis: Magnetic Cloak Without Superconductors

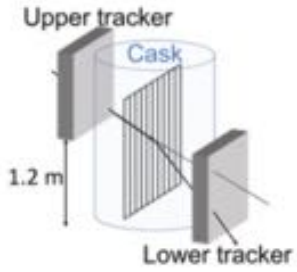


Featured in Physics | Editors' Suggestion

Verification of Spent Nuclear Fuel in Sealed Dry Storage Casks via Measurements of Cosmic-Ray Muon Scattering

J. M. Durham, D. Poulson, J. Bacon, D. L. Chichester, E. Guardincerri, C. L. Morris, K. Plaud-Ramos, W. Schwendiman, J. D. Tolman, and P. Winston
Phys. Rev. Applied **9**, 044013 (2018) – Published 10 April 2018

Physics Synopsis: Muons for Nuclear Waste Inspection



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APS physics

PHYSICAL REVIEW APPLIED 10, 034044 (2018)

Editors' Suggestion Featured in Physics

Simultaneous Broadband Vector Magnetometry Using Solid-State Spins

Jennifer M. Schloss,[1,2] John F. Barry,[2,3,4,5] Matthew J. Turner,[2,5] and Ronald L. Walsworth[2,4,5,*]

[1] *Department of Physics, Massachusetts Institute of Technology, Cambridge, Massachusetts 02139, USA*
[2] *Center for Brain Science, Harvard University, Cambridge, Massachusetts 02138, USA*
[3] *Lincoln Laboratory, Massachusetts Institute of Technology, Lexington, Massachusetts 02420, USA*
[4] *Harvard-Smithsonian Center for Astrophysics, Cambridge, Massachusetts 02138, USA*
[5] *Department of Physics, Harvard University, Cambridge, Massachusetts 02138, USA*

(Received 14 March 2018; revised manuscript received 19 July 2018; published 21 September 2018)

Some outlets covering our papers:

Physical Review Applied

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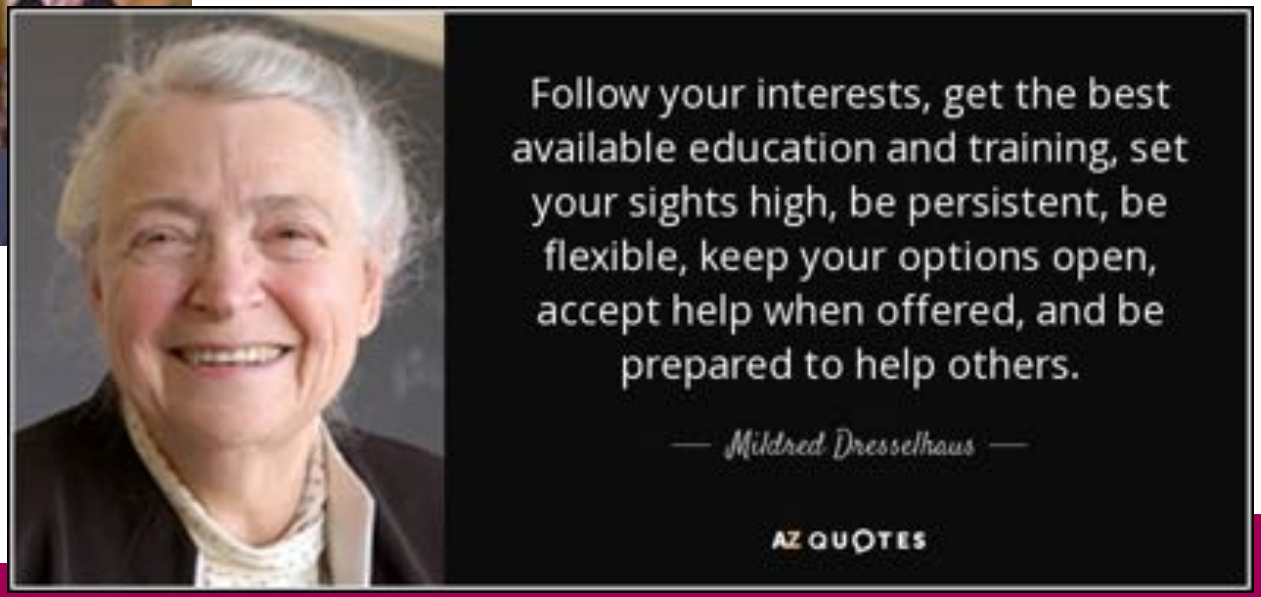
APS physics

Millie Dresselhaus, Queen of Carbon (1930 – 2017)

Inaugural Editorial Board Member of PRApplied

Television commercial by GE broadcast in 2017

See https://www.youtube.com/watch?v=drKOixEGARo



Collection in Memory of Mildred S. Dresselhaus

- Guest Editorial & first four papers were published on Feb. 20, 2018 (anniversary of her passing)
- Papers are being published throughout the year
- Collection will close on Nov. 12, 2018 (day after her birthday) with another Guest Editorial

THE MILLIE COLLECTION

Millie Dresselhaus: Her Living Scientific Legacy

Physical Review Applied is pleased to present the "Collection in Memory of Mildred S. Dresselhaus", documenting how the science she impacted lives on. Papers belonging to this collection will be published throughout 2018. An editorial by Guest Editors Morinobu Endo and David Tománek, and the first four contributions, are linked below.

Editorial: Collection in Memory of Mildred S. Dresselhaus

Riichiro Salto, Mizuno Masashi, Mildred S. Dresselhaus
Phys. Rev. Applied **9**, 024017 (2018)

Takumi Araki *et al.*
Phys. Rev. Applied **9**, 024018 (2018)

Nguyen T. Hung, Ahmad R.T. Nugraha, and Richiro Saito
Phys. Rev. Applied **9**, 024019 (2018)

K. Vandaele *et al.*
Phys. Rev. Applied **9**, 024020 (2018)

Where are we going?

- Keep increasing the size of the journal by attracting more good submissions in the traditional applied physics areas
- Identified three focus areas where we particularly want to increase our coverage:
  - quantum information processing and technology *including simulations, networking, sensing, metrology*
  - energy materials and devices
  - biomedical physics and engineering

A few word about *Physics*…

What is *Physics*?

http://physics.aps.org/

Physics provides daily online-only news and commentary about a selection of papers from the APS journal collection. The website is aimed at the reader who wants to keep up with highlights of physics research with explanations that don't rely on jargon and technical detail.

Articles on *Physics* fall into one of several categories:

Viewpoints

Commentaries on papers written by prominent experts in their field. Written by an active researcher for an audience with a college-level background in physics.

Read Viewpoints »

Focus Stories

Explanations of research papers geared toward students and non-experts. Written by a journalist for an audience with a general interest in physics.

Read Focus Stories »

Synopses

Brief news summaries about papers. Written by an editor or journalist for an audience with a college-level background in physics.

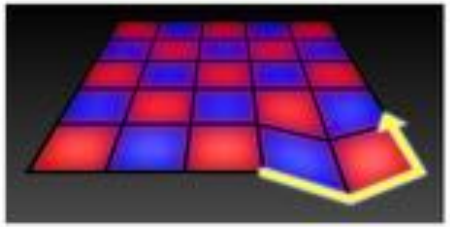
Read Synopses »

BIOLOGICAL PHYSICS

Synopsis: A "Meta" Solution to MRI Inhomogeneities

September 27, 2018

A simple metamaterial "atom" placed inside an MRI scanner may help create better spatial uniformity in the radio waves that drive the signal. Read More »



PHOTONICS

Viewpoint: Non-Hermitian Topological Systems

September 24, 2018

A theoretical framework tries to sort out where topological phases may arise in non-Hermitian systems—which are systems with gain and loss. Read More »

MAGNETISM

Synopsis: A Faster Diamond Magnetometer

September 20, 2018

Diamond-defect magnetometers can now simultaneously determine all spatial components of a magnetic field, leading to a factor of 4 decrease in measurement times. Read More »

APS Physics Tip Sheet – Sep 12, 2018

In this Issue: LHC Observes the Main Higgs Decay Mode, and A Ghost Trilobite Chemical Bond

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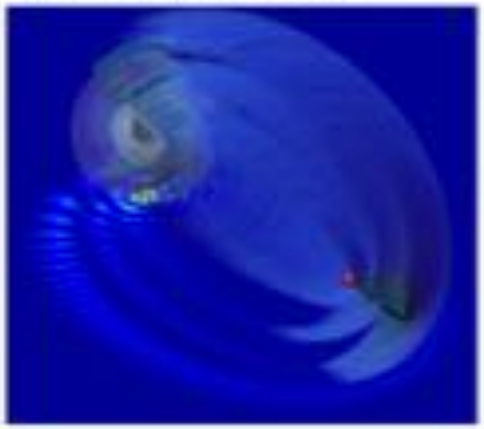
LHC Observes the Main Higgs Decay Mode

On August 28, the two CERN collaborations that discovered the Higgs boson, CMS and ATLAS, announced the observation of the Higgs boson decaying into a bottom quark and its antiparticle. This is the main decay mode of the Higgs boson, and observing it brings particle physicists closer to confirming their understanding of how the Higgs interacts with other fundamental particles. The new results, which probe the Higgs coupling to down-type quarks, are in line with the standard model of particle physics. *Physical Review Letters* will publish CMS's detection results on Sept 17.

* CMS Collaboration (cms-publication-committee-chair@cern.ch), "Observation of Higgs boson decay to bottom quarks," *Physical Review Letters* (expected publication date: Sept 17)

A Ghost Trilobite Chemical Bond



Calculations indicate that electromagnetic pulses applied to an atom could create a "ghost" chemical bond, in which one of the atom's electrons behaves as if bonded to an empty point in space.

In recent years, researchers have produced giant "trilobite" molecules, so called because one of the molecule's chemical bonds resembles the fossils of the extinct arthropod. In these molecules, one of the atoms is in a Rydberg state—a highly excited state in which an electron occupies a very large orbital. The size of the Rydberg orbital makes these molecules about 1000 times bigger than typical diatomic molecules. According to a new theoretical study, a precise sequence of electric and magnetic pulses could reshape the electronic wave function of a single hydrogen atom to match that of a trilobite molecule, even if no second atom is present. The team suggests that such a ghost trilobite molecule could be used to study if a preformed directional bond can speed up chemical reactions.

* Matthew T. Eiles (Purdue University, matt.eiles1@gmail.com, +1 (503) 658-5494) *et al.*, "Theoretical prediction of the creation and observation of a ghost trilobite chemical bond," *Physical Review Letters* (Published Sep 12)
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Acknowledgments: To various APS Editors and Staff