



日本からの学術成果発信 — 物理学会の取り組み

学術情報基盤作業部会

平成23年4月28日

瀧川 仁 (物理学会刊行委員長、東京大学物性研究所)

1. 日本の物理学コミュニティと学術誌
2. 物理系学術誌刊行センターの活動と課題
3. PTPからPTEPへ、オープン・アクセス誌創刊の計画
4. まとめと課題



1. 日本の物理学コミュニティと学術誌

日本物理学会

Proceedings of the Physico-Mathematical Society of Japan
1907 ~



Journal of the Physical Society of Japan
(JPSJ) 1946 ~

Progress of Theoretical Physics (PTP) 1946 ~
(Yukawa Institute for Theoretical Physics,
Kyoto University)

応用物理学会

Japanese Journal of Applied Physics (JJAP)
1962 ~



Applied Physics Express (APEX) 2008 ~

Optical Review 1994 ~ (日本光学会)

指導的な物理学者が JPSJ/PTP を支えてきた。

湯川秀樹 (Proc. Phys.-Math. Soc. Japan. 1935)

On the Interaction of Elementary Particles. I.

By Hideki YUKAWA.

(Read Nov. 17, 1934)

§1. Introduction

At the present stage of the quantum theory little is known about the nature of interaction of elementary particles. Heisenberg considered the interaction of "Platzwechsel" between the neutron and the proton to be of importance to the nuclear structure.⁽¹⁾

Recently Fermi treated the problem of β -disintegration on the hypothesis of "neutrino"⁽²⁾. According to this theory, the neutron and the proton can interact by emitting and absorbing a pair of neutrino



朝永振一郎 (PTP 1946)

Progress of Theoretical Physics Vol. I, No. 2, Aug.-Sept., 1946.

On a Relativistically Invariant Formulation of the Quantum Theory of Wave Fields.*

By S. TOMONAGA

(Received May 17, 1946)

§1. The formalism of the ordinary quantum theory of wave fields.

Recently Yukawa⁽¹⁾ has made a comprehensive consideration about the basis of the quantum theory of wave fields. In his article he has pointed out the fact that the existing formalism of the quantum field theory is not yet perfectly relativistic.

Let $v(xys)$ be the quantity specifying the field, and $\lambda(xys)$ denote its canonical conjugate. Then the quantum theory requires the commutation relations of the form:

$$\begin{cases} [v(xys), v(x'y's't')] = [\lambda(xys), \lambda(x'y's't')] = 0 \\ [v(xys), \lambda(x'y's't')] = i\hbar\delta(x-x')\delta(y-y')\delta(s-s'), \end{cases} \quad (1)**$$

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小林誠、益川敏英 (PTP 1973)



Progress of Theoretical Physics, Vol. 49, No. 2, February 1973

CP-Violation in the Renormalizable Theory of Weak Interaction

Makoto KOBAYASHI and Toshihide MASKAWA

Department of Physics, Kyoto University, Kyoto

(Received September 1, 1972)

In a framework of the renormalizable theory of weak interaction, problems of CP-violation are studied. It is concluded that no realistic models of CP-violation exist in the quartet scheme without introducing any other new fields. Some possible models of CP-violation are also discussed.

When we apply the renormalizable theory of weak interaction¹⁾ to the hadron system, we have some limitations on the hadron model. It is well known that there exists, in the case of the triplet model, a difficulty of the strangeness changing neutral current and that the quartet model is free from this difficulty. Furthermore, Maki and one of the present authors (T.M.) have shown²⁾ that, in the latter case, the strong interaction must be chiral $SU(4) \times SU(4)$ invariant as



江崎玲於奈
(Physical Review
1958)



小柴昌俊
(Physical Review Letters
1987)



南部陽一郎
(Physical Review
1961)

久保亮五 (線形応答理論) JPSJ 1957

近藤淳 (Kondo Effect) PTP 1964

JPSJの特徴

The screenshot shows the JPSJ website homepage. At the top, it displays the JPSJ logo and the text 'Journal of the Physical Society of Japan'. Below the logo, there are navigation links for 'Home', 'Authors', 'Referees', and 'Librarians'. A search bar is located on the left side. The main content area features a large green banner for 'Iron-Pnictide and Related Superconductors'. Below this, there are sections for 'Current Volume', 'Most Cited Articles in 2010', and 'JPS Award for Outstanding Papers'. The 'News and Comments' section is prominent, listing various articles with dates from April 2011 to December 2010. On the right side, there are sections for '2009 Impact Factor 2.572' and 'News and Comments'. The bottom of the page has a sidebar with 'OPEN SELECT' and 'JPS Award for Outstanding Papers' buttons.

鉄系超伝導体関連のコレクション

良く引用される論文
(1年間オープン)

物理学会論文賞
(JPSJ/PTPが対象)

注目論文(~3編/月)
プレス発表)

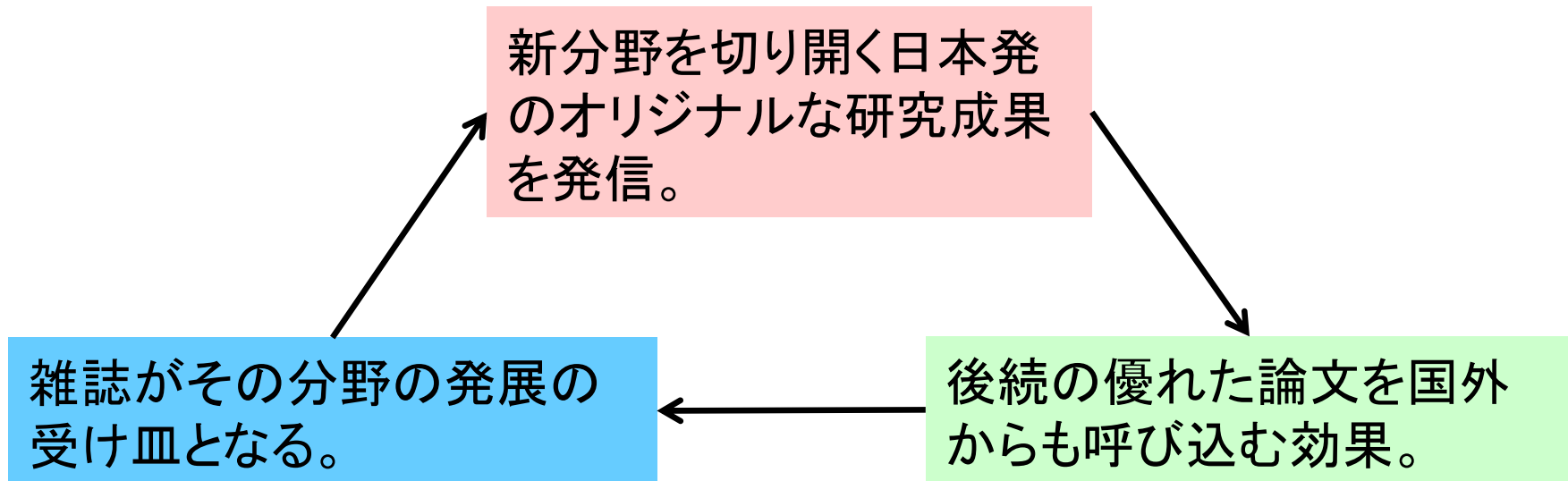
他分野の研究者向けの
解説

オープン・セレクト
著者負担でオープン化

公開後一か月間
全論文をオープン。

2004年から専任編集長制「投稿論文を待つ」から「より良い論文を集める」へ!⁴

日本で雑誌を刊行する意義



1. 雑誌を見れば、日本のリードする研究分野が分かる。
JPSJの場合は超伝導、磁性など。

2. 査読プロセスを他者に任せることの危険性。

例：細野グループ(東工大)による鉄系超伝導体の発見

JPSJの迅速・公正な査読は高く評価されている。

物理関係のトップ・ジャーナル

2009年JCR “PHYSICS, MULTIDISCIPLINARY”

	IF		TC		EigenFactor	
1	REV MOD PHYS	33.145	RPL	332130	PRL	1.26903
2	PHYS REP	17.752	PHYS LETT B	57638	PHYS LETT B	0.14984
3	NAT PHYS	15.491	REV MOD PHYS	27005	NAT PHYS	0.10713
4	REP PROG PHYS	11.444	PHYS LETT A	26352	EPL	0.08934
5	ACTA PHYS SLOVACA	7.455	J PHYS A	20324	REV MOD PHYS	0.08135
6	PRL	7.328	PHYS REP	18855	NEW J PHYS	0.07639
7	PHYS LETT B	5.083	JPSJ	17063	PHYS LETT A	0.07117
8	SOFT MATTER	4.869	EPL	16820	J PHYS A	0.07102
9	PHYS TODAY	4.437	CHAOS SOLITON FRACT	15542	PHYS REP	0.05781
10	RIV NUOVO CIMENTO	3.5	PHYSICA A	14746	JPSJ	0.05428
11	CHAOS SOLITON FRACT	3.315				
12	NEW J PHYS	3.312				
13	CLASSI QUANT GRAV	3.029				
14	EPL	2.893				
15	CONTEMP PHYS	2.789				
16	ANN PHYS-NEW YORK	2.677				
17	PHYS-USP+	2.628				
18	GEN RELAT GRAVIT	2.616				
19	JPSJ	2.572				
20	PTP	2.368				

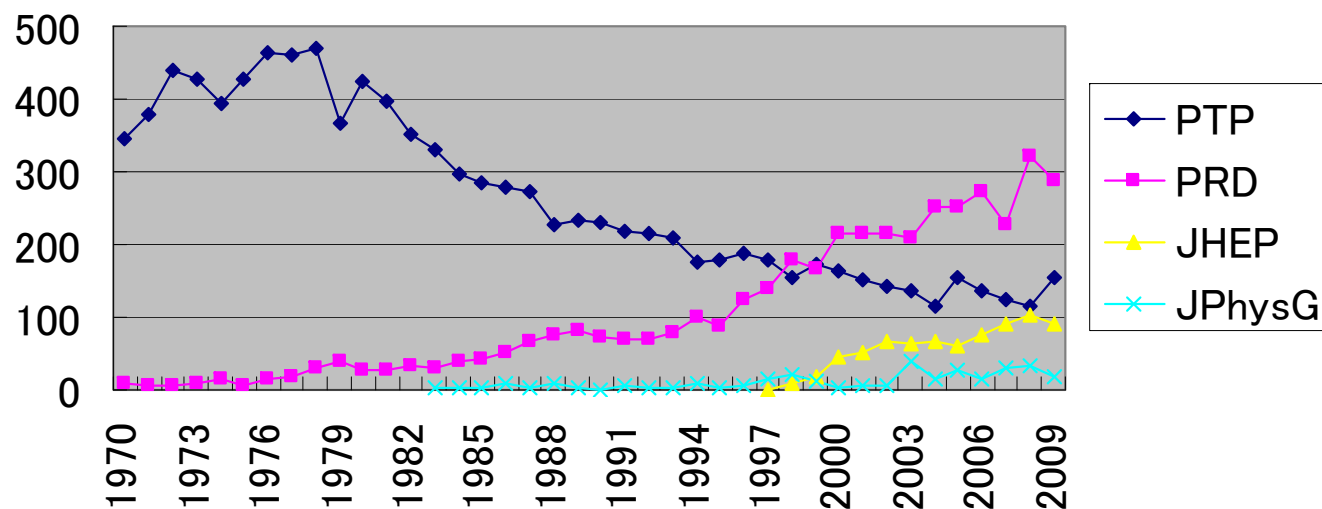
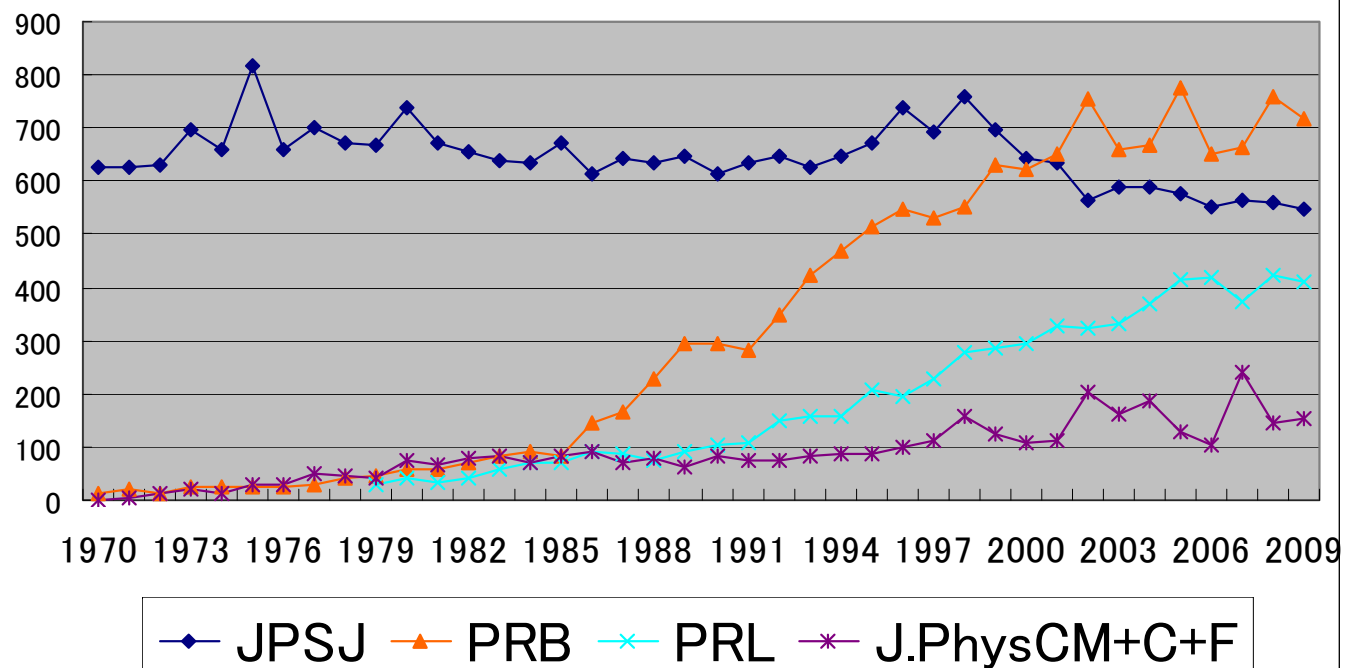
応用物理関係のトップ・ジャーナル

2009年JCR "Applied Physics"

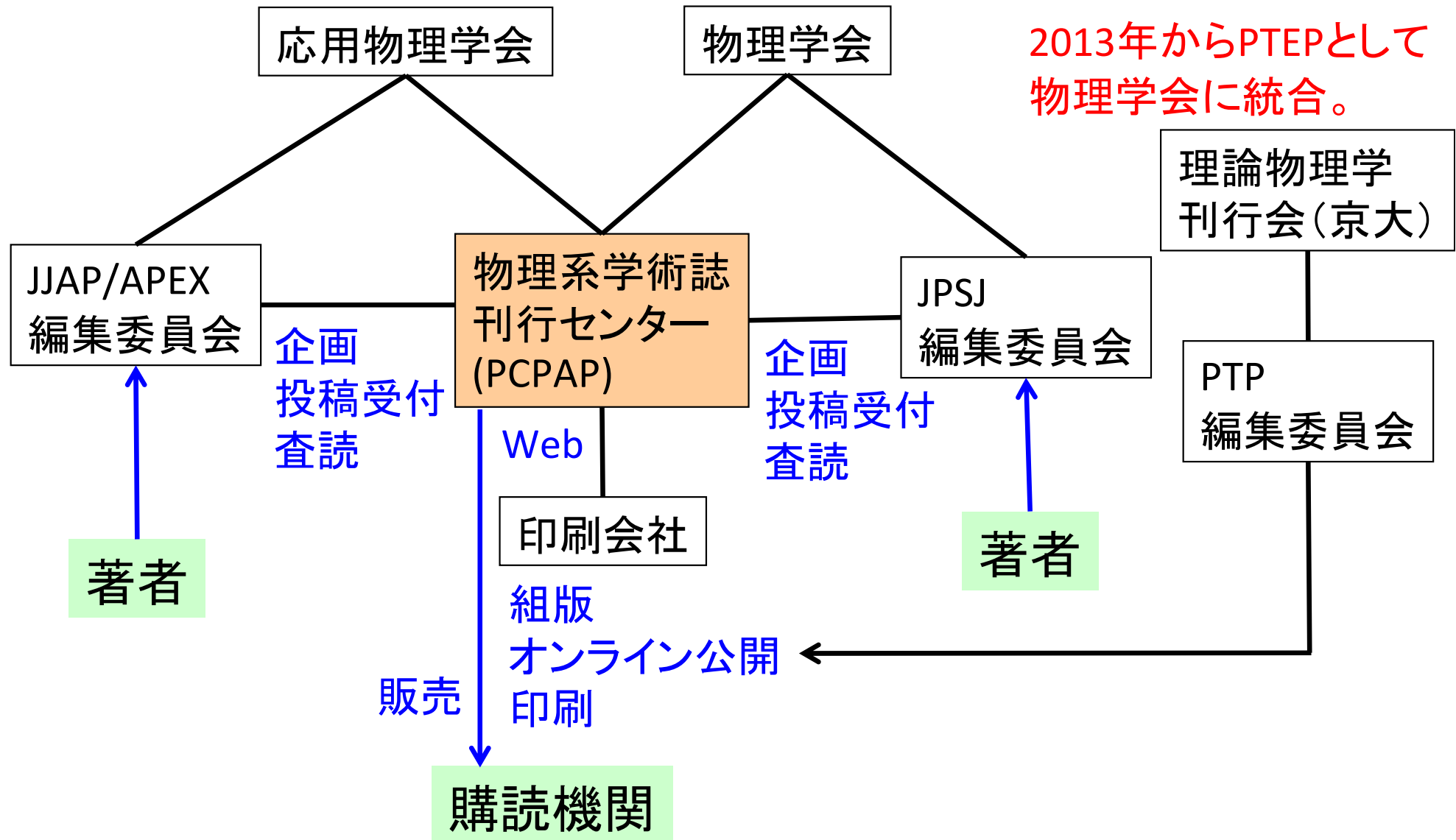
Journal Title	IF		TC		Eigenfactor
1 NAT MATER	29.504	APPL PHYS LETT	186353	APPL PHYS LETT	0.71698
2 NAT PHOTONICS	22.869	J APPL PHYS	115445	J APPL PHYS	0.32238
3 MAT SCI ENG R	12.217	ADV MATER	57456	ADV MATER	0.21307
4 ADV MATER	8.379	THIN SOLID FILMS	33298	NAT MATER	0.1993
5 ADV FUNCT MATER	6.99	JPN J APPL PHYS	29661	NANOTECHNOLOGY	0.11581
6 MRS BULL	6.33	NAT MATER	24465	THIN SOLID FILMS	0.09395
7 SMALL	6.171	APPL SURF SCI	21294	ADV FUNCT MATER	0.08934
8 LASER PHOTONICS REV	5.814	J PHYS D APPL PHYS	21238	JPN J APPL PHYS	0.08321
9 PROG PHOTOVOLTAICS	4.702	NANOTECHNOLOGY	20959	J PHYS D APPL PHYS	0.07986
10 NANO RES	4.37	SURF COAT TECH	20909	APPL SURF SCI	0.07585
11 PLASMA PROCESS POLYM	4.037	REV SCI INSTRUM	19371	SURF COAT TECH	0.06357
12 CURR OPIN SOLID ST M	4	ADV FUNCT MATER	16763	MATER LETT	0.06352
13 PROG ELECTROMAGN RES	3.763	MATER LETT	16195	REV SCI INSTRUM	0.06237
14 APPL PHYS LETT	3.554	IEEE T MAGN	15429	IEEE PHOTONIC TECH L	0.05244
15 ORG ELECTRON	3.262	IEEE T ELECTRON DEV	14135	SMALL	0.04751
16 NANOTECHNOLOGY	3.137	IEEE PHOTONIC TECH L	13103	IEEE T ELECTRON DEV	0.04497
17 NANOSCALE RES LETT	2.894	APPL PHYS A-MATER	10244	NAT PHOTONICS	0.03606
18 SUPERCOND SCI TECH	2.694	J VAC SCI TECHNOL B	10072	APPL PHYS A-MATER	0.03504
19 PHYS STATUS SOLIDI-R	2.56	IEEE J QUANTUM ELECT	9834	IEEE T MAGN	0.03472
20 IEEE T ELECTRON DEV	2.445	PHYS STATUS SOLIDI A	8574	APPL PHYS B-LASERS O	0.03073
21 APPL PHYS EXPRESS	2.223				
22 PHOTONIC NANOSTRUCT	2.131				
23 J PHYS D APPL PHYS	2.083				
24 J APPL PHYS	2.072				
25 PLASMA CHEM PLASMA P	2.039				
57 JPN J APPL PHYS	1.138				

海外誌への流出

JPSJ又はPTPに掲載された論文数と、外国誌に掲載された日本国内機関所属の著者を含む論文数の比較



2. 物理系学術誌刊行センターの活動と課題





物理学術誌刊行の現状

JPSJ: 専任編集長＋専任編集委員(1名)、Head Editor 13名、編集委員 74名
～500論文, 3000頁(年間), IF=2.57

APEX/JJAP共通: 編集委員長＋副委員長, 委員長特別補佐(1名),
シニアアドバイザー(3名), 編集運営委員(14名),

APEX(2008年創刊): 編集委員(国内16名, 海外4名)

～350論文, 1000頁(年間), IF=2.223

JJAP: 編集委員(国内84名, 海外18名),

～1700論文, 8000頁(年間), IF=1.138

PTP: 編集委員長, 編集委員(48名),

～110論文, ～2200頁(年間), IF=2.368

刊行センター (正職員8名、非常勤職員5名):

編集サポート, 製作管理, オンラインジャーナル運用・技術調査,
各種データ解析, 購読管理, etc.



刊行実務の課題

1. 次期オンライン・システム(プラットフォーム)の選択肢

- 独自のシステム開発
- J-stage
- 既存の標準システム(外国製)
- 海外出版機関との提携(次項)

2. 海外購読機関の拡大(ジャーナルのvisibilityの改善)

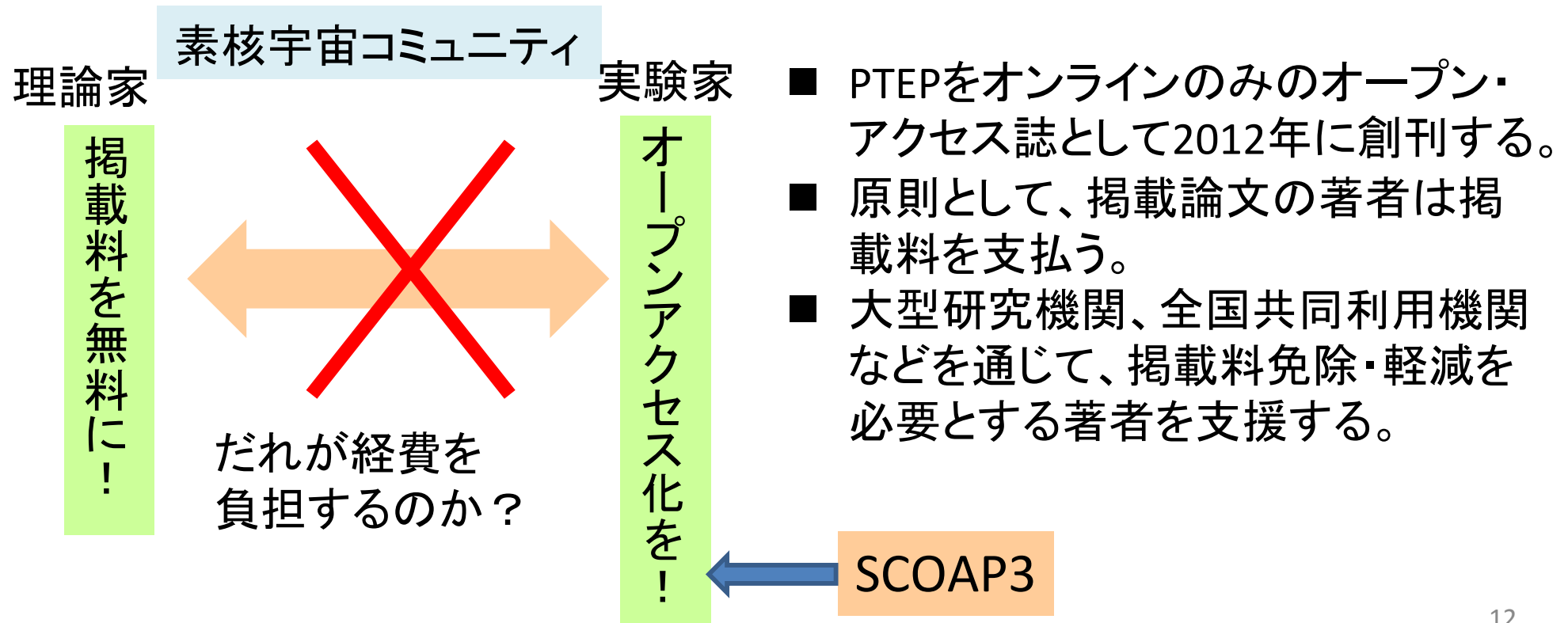
小組織では販売力に限界。特に海外コンソーシアには無力。
欧米の出版機関(非営利、学協会系)との販売提携の可能性。
(この場合、プラットフォームは自動的に決まる。)

プラットフォームは概ね標準化されている。
販売戦略にどう生かされるかで価値が決まる。

↑
購読モデルの雑誌にとって非常に重要。

3. オープン・アクセス誌 PTEP 創刊の計画

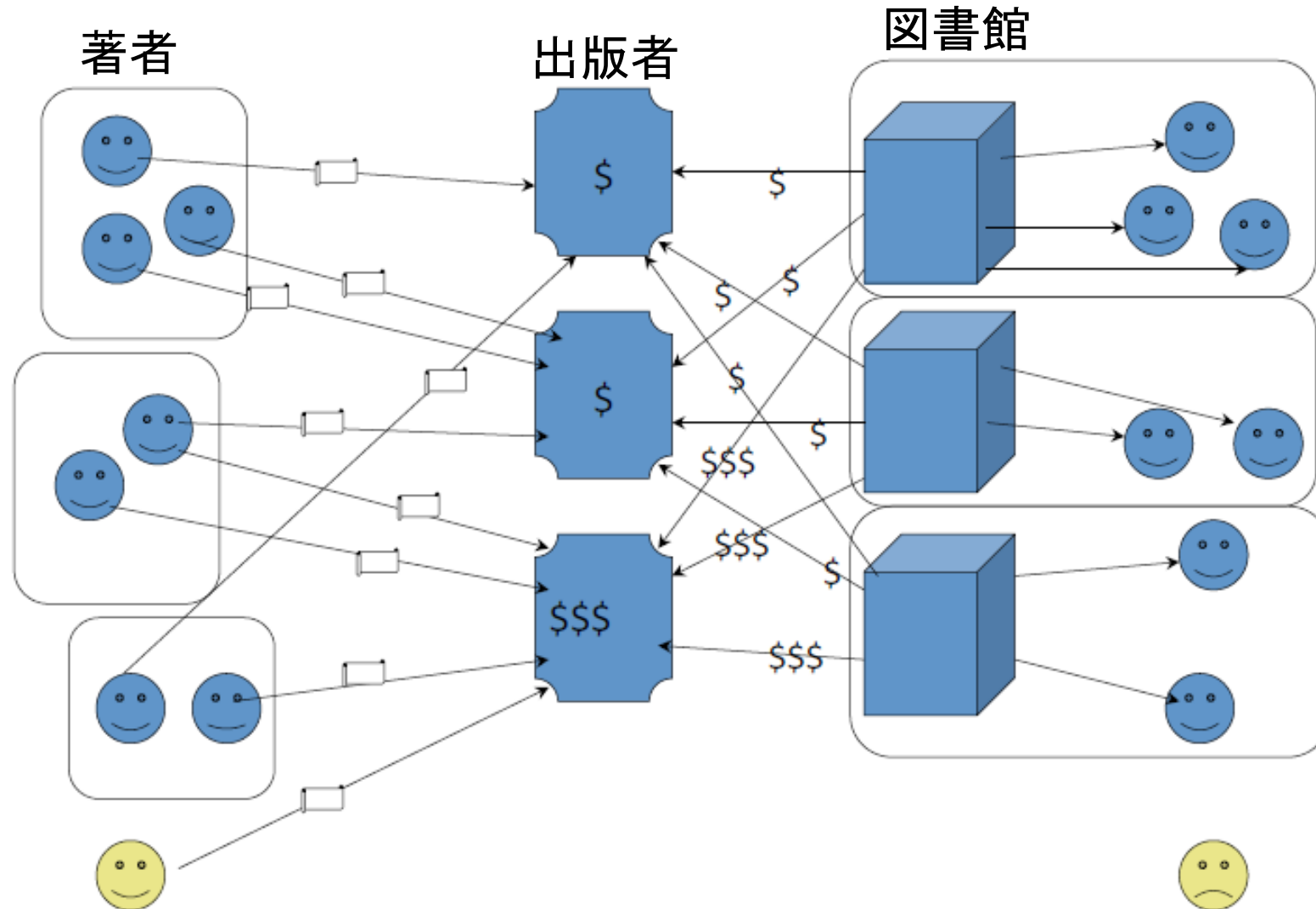
- PTPの刊行を2013年から物理学会+刊行センターに移行。
- この機会に素粒子、原子核、宇宙線・宇宙物理などの実験論文も。
Progress of Theoretical and Experimental Physics (PTEP) と改名。
それ以外の分野はJPSJへ。
- 2009-2010年に新雑誌の在り方を議論。



SCOAP3: Sponsoring Consortium for Open Access Publishing in Particle Physics

CERN(欧州原子核研究機構)の提案:

購読モデル

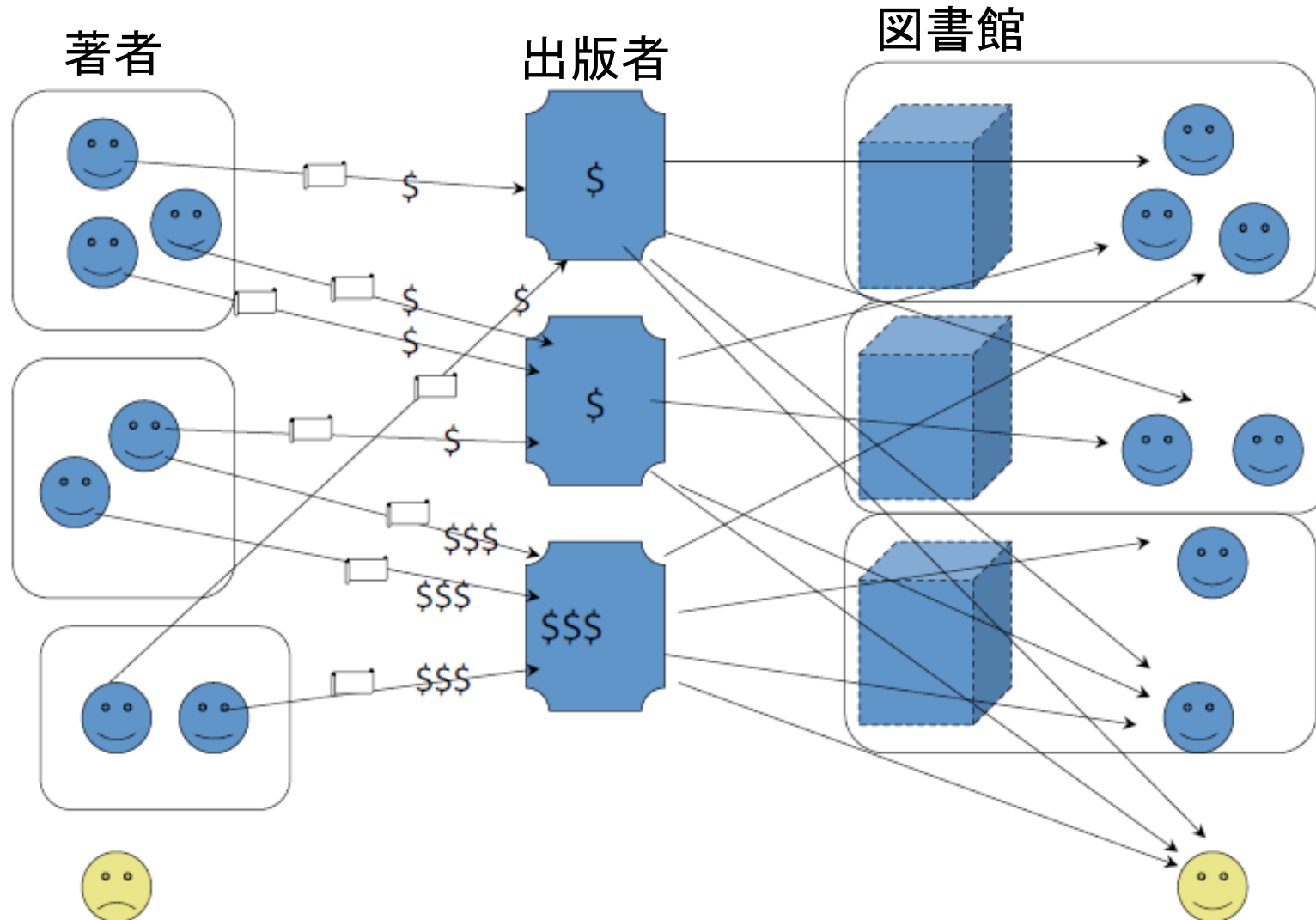


イラストはG. Sprouse氏 (APS Editor in Chief)による。

SCOAP3: Sponsoring Consortium for Open Access Publishing in Particle Physics

CERN(欧州原子核研究機構)の提案:

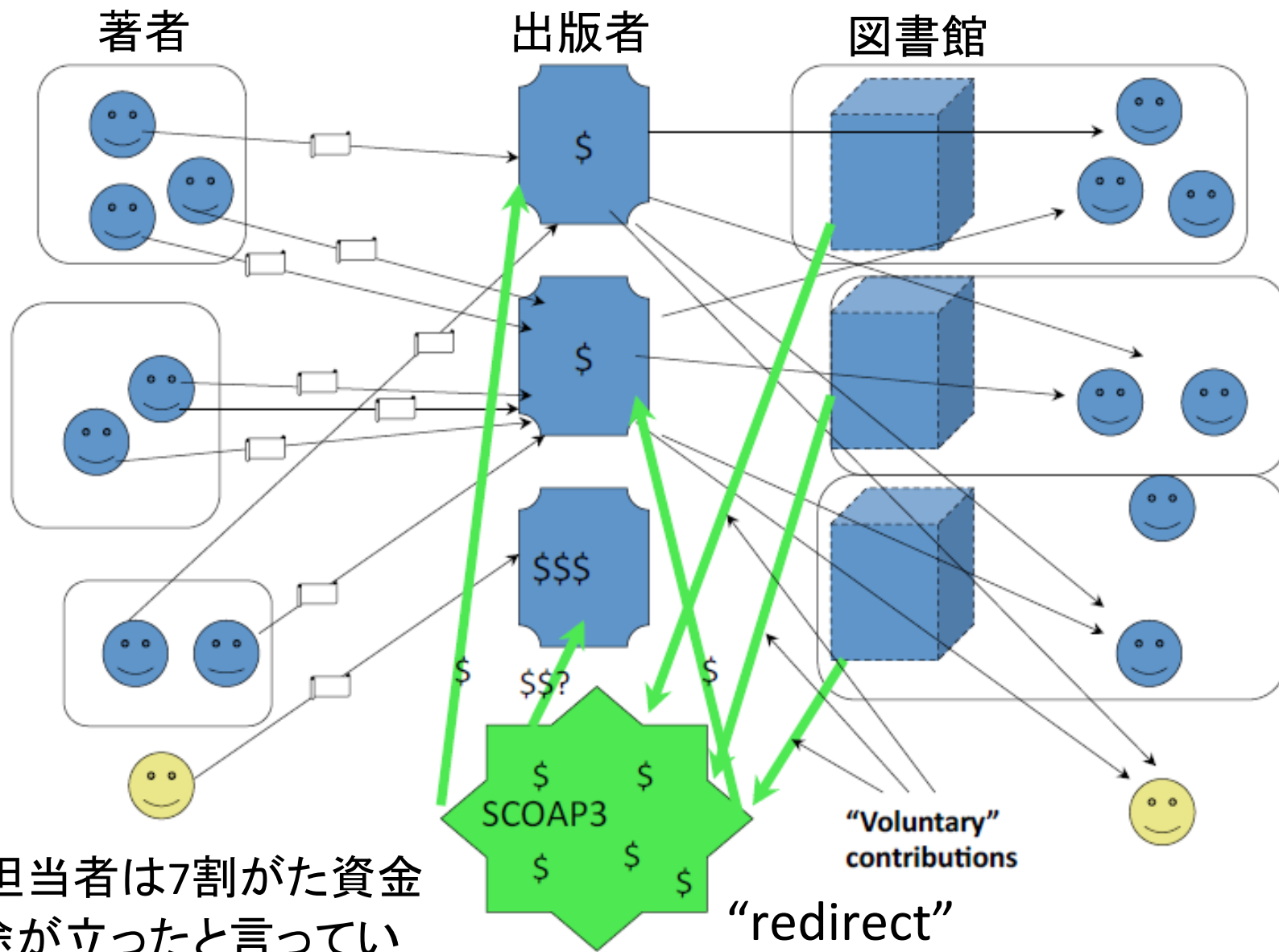
著者負担モデル(オープンアクセス)



イラストはG. Sprouse氏 (APS Editor in Chief)による。

SCOAP3: Sponsoring Consortium for Open Access Publishing in Particle Physics

CERN(欧州原子核研究機構)の提案:



CERN担当者は7割がた資金
の目途が立ったと言ってい
るが・・・

イラストはG. Sprouse氏 (APS Editor in Chief)による。

物理系オープン・アクセス誌の動向 I

New Journal of Physics (IOP Publishing、英国-ドイツ物理学会共同)

The screenshot shows the homepage of the New Journal of Physics. At the top, there are navigation links for 'Login', 'Create account', and 'Athens/Institutional login'. The main header features the journal title 'New Journal of Physics' and the tagline 'The open-access journal for physics'. Below this is a search bar with a 'Quick search' button and dropdown menus for 'Title/Abstract' and 'All Dates'. A navigation menu includes 'IOPscience', 'Home', 'Search', 'Collections', 'Journals', 'About', 'Contact us', 'My IOPscience', 'Authors', 'Referees', and 'Librarians'. The main content area includes a 'Deutsche Physikalische Gesellschaft DPG | IOP Institute of Physics' logo, a 'New Journal of Physics' cover image, a description of the journal's scope, and 'Volume listings' for the current volume (Number 4, April 2011) and journal archive (Vol 13, 2011). A '2009 Impact Factor' of 3.312 is displayed in a red box. 'Journal links' include 'Journal home', 'Scope', 'Editorial board', 'Abstracted in', 'Author benefits', 'Best of 2010', and 'NJP in the news'.

1999年創刊、IF=3.31
掲載料:\$1020

Physical Review X (American Physical Society) 2011年秋創刊予定、掲載料:\$1500

The screenshot shows the homepage of Physical Review X. The header features the 'Physical Review X' logo with the tagline 'expanding access' and the 'American Physical Society APS physics' logo. Navigation links include 'Log in', 'Create Account (what's this?)', 'RSS Feeds', and 'Email Alerts'. The main content area includes a sidebar with 'APS Journals', 'About This Journal', 'Search the Journals', 'APS Home', and 'Join APS'. The main text area features the title 'Physical Review X' and the subtitle 'APS's Newest Journal'. A description of the journal states: 'Physical Review X (PRX) is a new, global, online-only, open access, primary research journal covering all of physics and its application to related fields. Authors publishing in PRX will take advantage of the unlimited distribution of their results to readers and will benefit from the strong reputation associated with the Physical Review family of publications. PRX will bring valuable and innovative results to the broader physics readership.' A portrait of Jorge Pullin, Editor, is shown on the right.

Jorge Pullin, Editor

物理系オープン・アクセス誌の動向 II

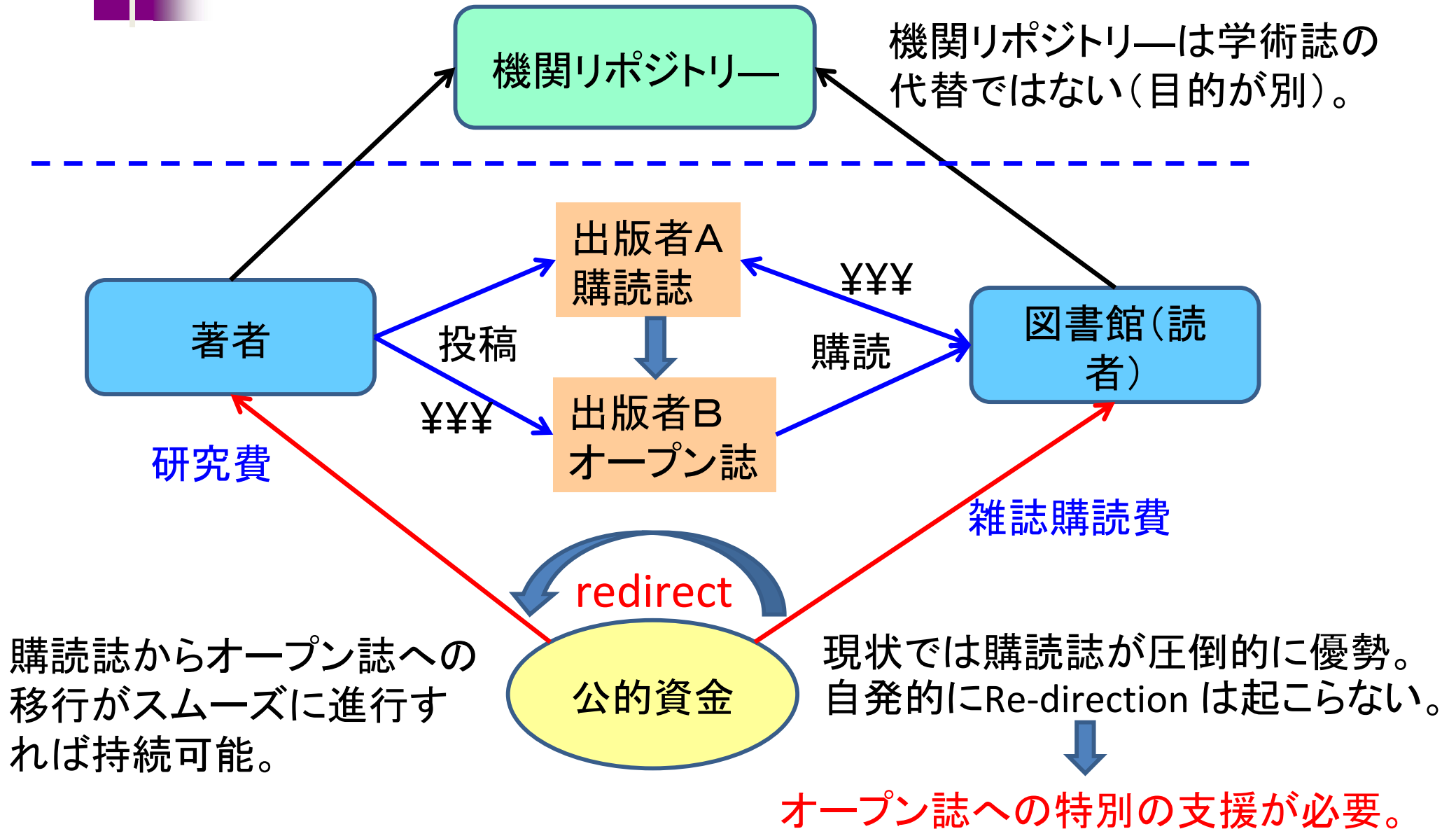
AIP Advances (American Institute of Physics) 2011年4月創刊、掲載料: \$1350

The screenshot shows the homepage of AIP Advances. At the top, there is a navigation bar with links for Sign In, View Cart, Feedback, and Help. Below this is a search bar with tabs for Volume/Page, Keyword, DOI, Citation, and Advanced. The search bar contains input fields for Volume and Page/Article, and a GO button. The AIP Advances logo is prominently displayed on the left. Below the search bar is a navigation menu with links for Home, Browse, About, Authors, Reviewers, Readers, Features, Advertisers, Scitation, and AIP Journals. A central banner encourages users to "Join the conversation! Rate and comment on AIP Advances articles." Below the banner, there are several sections: a "Current Issue" section with a "Submit Manuscript" button and a "Top 20 Most Downloaded" link; an "Announcements" section with a link to "Read the inaugural issue of AIP's open access journal, AIP Advances."; and an advertisement for edanz english editing by physicists. The AIP logo is visible in the bottom right corner of the screenshot.

オープン誌は物理系ジャーナルの世界的な潮流となるか？
Creative Commons License (著作権は著者に)

しかし、IOPP, APS, AIPともに購読誌で十分な収益を得ている。
オープン誌単独でも成功する可能性は？

持続可能なオープン誌の経営モデルは？





購読モデルから著者負担モデルへの転換のために

1. 科研費(研究成果公開促進費): 対象となる学術定期刊行物の中に、オンライン・オープン・アクセス誌を新たなカテゴリーとして加える。
2. オープン・アクセス誌に投稿する著者、或いは購読誌に掲載された論文をオープン・セレクトに指定する著者への財政的支援。(例えば、研究費に一定の割合で、オープン論文にのみ適用できる研究成果公開費を付与する。)
3. 研究機関や大学に対し、オープン・アクセス誌への投稿支援のための基金を作ることを奨励する。(海外の例)

オープン誌の持続的刊行には「はずみ」が必要

Compact for Open-Access Publishing Equity

THE COMPACT FOR OPEN-ACCESS PUBLISHING EQUITY

*We the **undersigned universities** recognize the crucial value of the services provided by **scholarly publishers**, the desirability of open access to the scholarly literature, and the need for a stable source of funding for publishers who choose to provide open access to their journals' contents. Those universities and funding agencies receiving the benefits of publisher services should recognize their collective and individual responsibility for that funding, and this recognition should be ongoing and public so that publishers can rely on it as a condition for their continuing operation.*

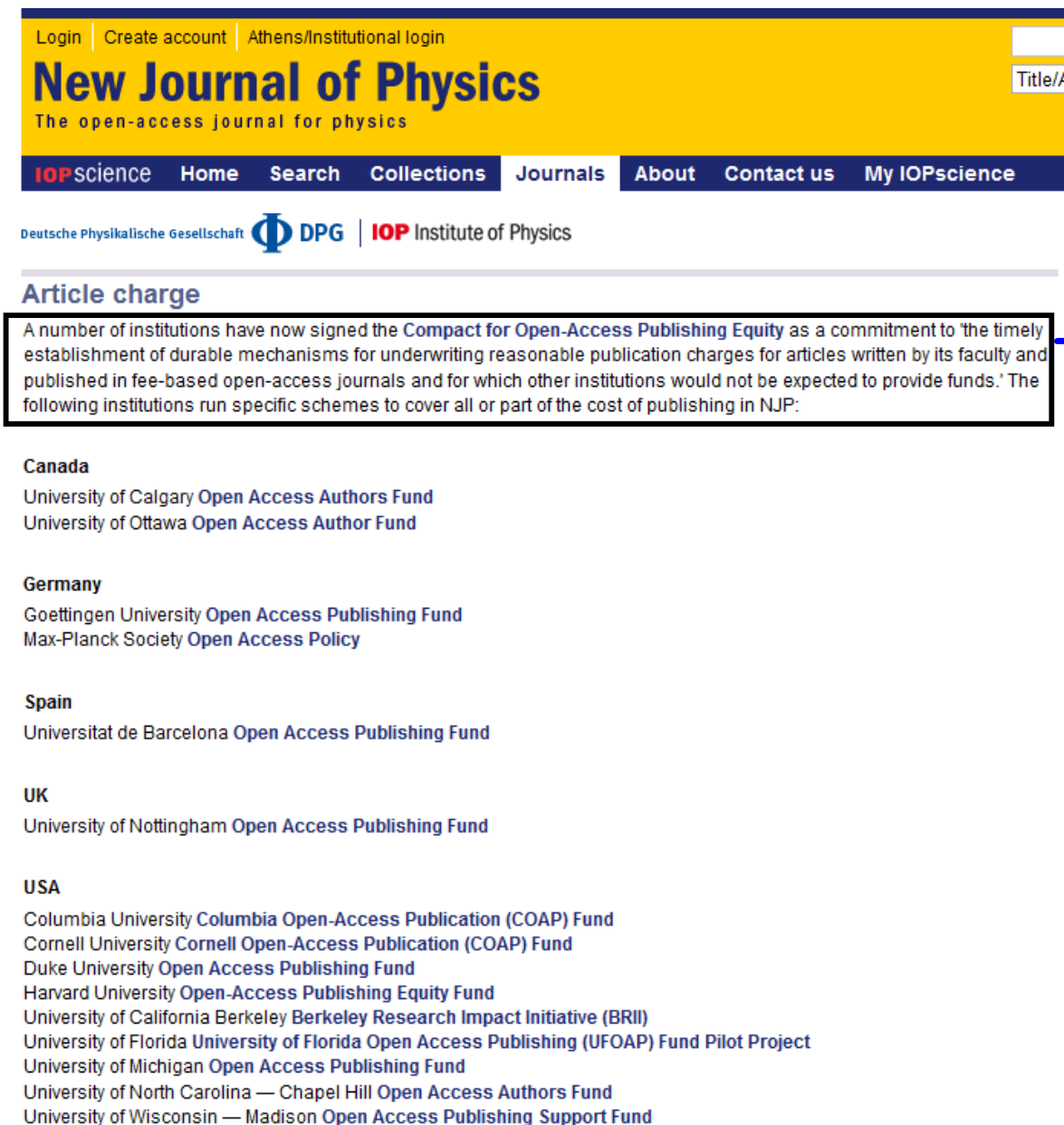
*Therefore, each of the **undersigned universities** commits to the **timely establishment of durable mechanisms** for **underwriting reasonable publication charges** for articles written by its **faculty** and published in **fee-based open-access journals** and for which other institutions would not be expected to provide funds. We encourage other universities and research funding agencies to join us in this commitment, to provide a sufficient and sustainable funding basis for open-access publication of the scholarly literature.*

/signed/

- [Overview](#)
- [The Compact](#)
- [Signatories](#)
- [Supporters](#)
- [News](#)
- [FAQ](#)
- [Support COPE](#)
- [Links](#)

この時点では精神論的な提案に留まる。どう具体化するかはこれからの課題。

オープン・アクセス誌支援の例



The screenshot shows the top navigation bar of the New Journal of Physics website. The main title is "New Journal of Physics" with the subtitle "The open-access journal for physics". Below the title is a navigation menu with links for "IOPscience", "Home", "Search", "Collections", "Journals", "About", "Contact us", and "My IOPscience". The page content is titled "Article charge" and contains a text box with the following text: "A number of institutions have now signed the Compact for Open-Access Publishing Equity as a commitment to 'the timely establishment of durable mechanisms for underwriting reasonable publication charges for articles written by its faculty and published in fee-based open-access journals and for which other institutions would not be expected to provide funds.' The following institutions run specific schemes to cover all or part of the cost of publishing in NJP:". Below this text, there are sections for "Canada", "Germany", "Spain", "UK", and "USA", each listing specific institutions and their open-access publishing funds.

Login | Create account | Athens/Institutional login

New Journal of Physics

The open-access journal for physics

IOPscience Home Search Collections Journals About Contact us My IOPscience

Deutsche Physikalische Gesellschaft DPG | IOP Institute of Physics

Article charge

A number of institutions have now signed the [Compact for Open-Access Publishing Equity](#) as a commitment to 'the timely establishment of durable mechanisms for underwriting reasonable publication charges for articles written by its faculty and published in fee-based open-access journals and for which other institutions would not be expected to provide funds.' The following institutions run specific schemes to cover all or part of the cost of publishing in NJP:

Canada
University of Calgary [Open Access Authors Fund](#)
University of Ottawa [Open Access Author Fund](#)

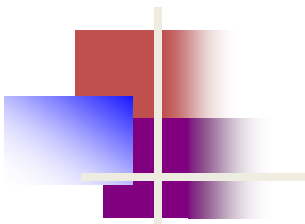
Germany
Goettingen University [Open Access Publishing Fund](#)
Max-Planck Society [Open Access Policy](#)

Spain
Universitat de Barcelona [Open Access Publishing Fund](#)

UK
University of Nottingham [Open Access Publishing Fund](#)

USA
Columbia University [Columbia Open-Access Publication \(COAP\) Fund](#)
Cornell University [Cornell Open-Access Publication \(COAP\) Fund](#)
Duke University [Open Access Publishing Fund](#)
Harvard University [Open-Access Publishing Equity Fund](#)
University of California Berkeley [Berkeley Research Impact Initiative \(BRII\)](#)
University of Florida [University of Florida Open Access Publishing \(UFOAP\) Fund Pilot Project](#)
University of Michigan [Open Access Publishing Fund](#)
University of North Carolina — Chapel Hill [Open Access Authors Fund](#)
University of Wisconsin — Madison [Open Access Publishing Support Fund](#)

A number of institutions have now signed the [Compact for Open-Access Publishing Equity](#) as a commitment to 'the timely establishment of durable mechanisms for underwriting reasonable publication charges for articles written by its faculty and published in **fee-based open-access journals** and for which other institutions would not be expected to provide funds.' **The following institutions run specific schemes to cover all or part of the cost of publishing in NJP:**



4. まとめと課題

1. 今後物理学会では購読誌 (JPSJ) とオープン・アクセス誌 (PTEP) を両立。
2. それぞれに固有の課題を抱える。
 - JPSJは分野の拡大と購読機能数 (visibility) の改善を目指す。
 - PTEPは掲載料免除・軽減を必要とする著者への支援が課題。
3. 将来はより多くの雑誌が完全オープン化することが望ましい。購読モデルも著者負担モデルも、経費の源は同じ。雑誌のオープン化を促進するような公的資金の制度設計を考えるべき。
4. オープン・アクセス誌の経営モデルはまだ確立されていない。オープン化に至る過程は雑誌により異なる。JPSJの場合は、段階的なオープン化やオープン・セレクトを推進している。PTEPのような完全オープン誌には組織的な支援が必要。
5. 学術誌刊行の実務をどこまで自前でまかなうか、何をアウトソーシングすべきかは、コミュニティによって異なる。物理系では刊行センターの実務経験が財産となっている。